

Chapter 2 ALTERNATIVES

This chapter describes the proposed rail improvements considered in this Tier 1/program-level environmental document. Because this is a program-level analysis considering the Rail Improvements Alternative for the LOSSAN Corridor and is intended to define broad differences between alternatives, the level of detail for alternatives is conceptual or general rather than project-specific (40 C.F.R. § 1508.28; 14 C.C.R. § 15385). Subsequent project-specific environmental documents and analysis would assess preliminary engineering information and provide more details on environmental impacts for individual projects should the Rail Improvements Alternative be selected.

The California Department of Transportation (Department) and the Federal Railroad Administration (FRA) developed and evaluated alternatives through an iterative process that included considering work done by others, independent planning and feasibility studies, scoping process, and the LOSSAN Strategic Plan. All alternatives that have been considered by the Department and the FRA are described in this chapter, including those rejected from further consideration in this Program EIR/EIS and the basis for their rejection. The No Project/No Action Alternative and the Rail Improvements Alternative are described in this chapter and their development is summarized.

This chapter is organized into the following five sections.

- Section 2.1 describes the development of initial alternatives.
- Section 2.2 summarizes the initial alternatives considered.
- Section 2.3 describes the No Project Alternative
- Section 2.4 describes the Rail Improvements Alternative, including the system-performance criteria, alignment alternatives, and station alternatives considered and rejected, as well as those carried forward for further consideration in this Program EIR/EIS.

Section 2.5 summarizes the alternatives analyzed in this Program EIR/EIS.

2.1 DEVELOPMENT OF INITIAL ALTERNATIVES

This section describes the process used to evaluate conceptual alternatives presented in previous feasibility studies and identified through the scoping and screening process for both the LOSSAN Rail Corridor Improvements project and the California High-Speed Train project. The combination of these efforts led to the final set of conventional-rail improvement options for the LOSSAN corridor that are analyzed in this Draft Program EIR/EIS. Key criteria used to distinguish between alternatives have been described in Chapter 1, *Purpose and Need and Objectives*. Those criteria include reliability and travel time, safety, connectivity, , and ridership potential. In addition to these criteria, the alternatives had to be practicable and constructible, given Right-of-Way constraints and sensitivity to environmental and community impacts.

2.1.1 Background

Since 1998, three planning and feasibility studies have been completed that are relevant to LOSSAN corridor alternatives development. The first of these was conducted by the California High-Speed Rail Authority (Authority), building on previous work from 1996 done by the past California Intercity High Speed Rail Commission (Commission), in conjunction with a statewide High-Speed Train project. The other two are statewide rail plans prepared by the Department and others, which include long-term goals and improvements needed in the LOSSAN corridor,

A. PREVIOUS STUDY FOR THE STATEWIDE HIGH-SPEED TRAIN PROJECT

As explained in Chapter 1, the Department has worked with the Authority to develop the technical data and perform public and agency outreach for the Department's LOSSAN Rail Corridor Improvements Program EIR/EIS. (LOSSAN corridor improvements are also considered in the Authority's statewide High-Speed Train Program EIR/EIS.) This section briefly describes previous studies that provided input to the Department's development of the rail improvements evaluated in this document. Specific descriptions of corridors/alignments within the LOSSAN region that were evaluated and either eliminated or carried forward on the basis of this previous study are presented in Sections 2.2 and 2.4, respectively.

The Department adopted the findings and conclusions of this study, and built on those conclusions in its continued work with the Authority that led to the Department's LOSSAN Strategic Plan.

California High-Speed Rail Authority Corridor Evaluation (1998-1999)

In September of 1998, the Authority commissioned a Corridor Evaluation study to assess and evaluate the viability of various corridors throughout the state for implementation as part of a statewide High-Speed Train system. The study focused on identifying potential system alternatives (train technologies) and corridors for the implementation of high-speed train (HST) service and evaluating the feasibility and viability of those alternatives. Environmental constraints and potential for impact were considered in the study with the objective of avoiding or minimizing potential impacts to sensitive resources, where possible.

The Authority and its consultants evaluated potential corridors on the basis of capital, operating and maintenance costs, travel times and engineering, operational, and environmental constraints. The corridors were compared and evaluated on a regional basis and as part of a statewide system. This study is documented in the *California High-Speed Rail Corridor Evaluation Final Report*, 1999¹.

Most of the corridors considered follow existing railroad rights-of-way or highways, particularly in the urban areas, to avoid and minimize environmental impacts. Many of the rail alignment options and station location options emerged from regional and local agency input. Potential locations for new stations and improvements to existing stations were identified for operational and forecasting purposes, and alternative sites were considered as part of the corridor evaluation; however, specific station sites were not selected as a result of previous studies.

¹ California High-Speed Rail Corridor Evaluation Final Report, 1999

This study provided the Authority with a basis for recommending a feasible network of HST corridors. In addition, other potential corridors and new issues were identified as regional and local agencies provided their input. To address these issues, further corridor investigations and evaluations were conducted in several areas of the State and compared in the context of updated information on previously studied routes.

At the conclusion of this study, the Authority found: that dedicated² high-speed rail service in the LOSSAN rail corridor south of central Orange County would result in extensive environmental impacts and may be infeasible. The 1999 study concluded that further evaluation of conventional rail improvements in the LOSSAN corridor should be carried forward, and that the I-15 corridor continue to be evaluated (by the Authority) for dedicated high-speed rail.

B. STATEWIDE RAIL PLANS

Two statewide rail plans were prepared by the Department and others, addressing proposed capital improvements and service goals for the state rail system, including the LOSSAN corridor. In addition to the previous HST studies described above, these rail plans helped form the basis for the Department's alternatives development. These plans are briefly described below, and specific alternatives evaluated are described in Section 2.2.

California Passenger Rail System 20-Year Improvement Plan (2001)

This 20-Year Improvement Plan was developed as a comprehensive blueprint for a passenger rail system in California³. This document was developed with the involvement of four task forces, one for each intercity corridor, which includes the Pacific Surfliner (LOSSAN corridor), San Joaquin, Capital Corridor and a proposed Coast Route.

This plan provided a baseline for potential rail improvements to be performed along the LOSSAN corridor and outlines an operational vision of the next 20 years for the corridor, including hourly service between Los Angeles and San Diego and specific double track, bridge, tunnel, highway crossing and station improvements along the current alignment from San Luis Obispo to San Diego.

The 20-Year Improvement Plan was the source of several of the options considered in this document.

Caltrans State Rail Plan (2002)

Government Code Section 14036 requires the California Department of Transportation to complete a 10-Year State Rail Plan with both passenger and freight rail elements. This Plan must be updated every two years. In the 2002 Plan⁴, the passenger rail element reviews the current operation of State-supported intercity rail passenger service and outlines 10-Year plans for the period 2001-02 through 2010-11 for capital improvements and service expansions.

² "Dedicated" service would not share tracks with existing passenger and freight rail services.

³ California Passenger Rail System 20-Year Improvement Plan, March 2001. Sponsored by Amtrak California.

⁴ Caltrans 10-Year State Rail plan; (2002).

This Plan outlines the following 8 objectives for the LOSSAN corridor to be achieved by Fiscal Year (FY) 2011:

- Increase annual ridership 52 percent, from 1,662,000 to 2,518,000 passengers.
- Increase annual revenues 68 percent, from \$20.4 million to \$34.3 million, for the State-supported 67 percent of the route operation.
- Increase revenue/cost (farebox) ratio from 53.5 percent to 57.7 percent.
- Reduce the State cost per passenger mile from 16 to 13 cents.
- Increase frequency of daily round-trip service, from 11 to 16 trains between Los Angeles and San Diego, from 4 to 6 between Los Angeles and Santa Barbara/Goleta, and from 1 to 2 trains extended beyond Goleta to San Luis Obispo.
- Reduce train running times to less than two hours between Los Angeles and San Diego, two hours between Los Angeles and Santa Barbara/Goleta and two hours between Santa Barbara and San Luis Obispo.
- Improve the reliability (on-time performance) of trains
- Provide real-time information to passengers on train status (e.g. anticipated arrival time), particularly at unstaffed stations.

The Department considered these objectives in its formulation and evaluation of a range of reasonable and practicable alternatives for the LOSSAN Rail Improvements Project.

2.1.2 Formulation of Initial Alternatives

The Department formulated its initial alternatives for the LOSSAN corridor rail improvements based on previous analyses (described above) and information relevant to the LOSSAN corridor gained during the Authority's scoping and alternative screening processes conducted for the Authority's statewide HST project. These processes culminated in the Department's final screening of alternatives in the LOSSAN Strategic Plan, and the carrying forward of the rail improvement options for the LOSSAN corridor analyzed in this Program EIR/EIS. The statewide and Department processes are summarized below.

A. STATEWIDE HIGH-SPEED TRAIN PROJECT

As the HST program moved to the environmental review phase, the Authority and FRA began the process of defining reasonable and feasible alternatives to be considered in the statewide HST Program EIR/EIS. This effort involved the development of an HST alternative (including design options), a No Project/No Action Alternative, and a Modal Alternative addressing expansion of roadway and airport facilities in the state. More detail regarding the Authority's scoping process and public and agency involvement program can be found in the *California High-Speed Train Project Draft Program EIR/EIS*, (2004)

The early definition of the HST project and characterization of a feasible range of alternatives to evaluate in the statewide Program EIR/EIS involved frequent coordination with public agencies, including the Department, and the general public. Public and agency input was obtained by the Authority during a series of public meetings held

between February and April 2001, at which Department staff also participated. Additional agency and public input was obtained during the scoping process (April and May, 2001) pursuant to CEQA and NEPA. The scoping process and outcomes, including comments and concerns pertaining to the LOSSAN region, are documented in the *California High-Speed Train - Statewide Scoping Report*⁵. The Department used the scoping process input in their subsequent development of alternatives pertaining to the LOSSAN corridor.

On the basis of the statewide scoping effort and the information developed in the earlier studies discussed above, the Authority and the FRA defined a range of promising corridors for development of the HST system.

In addition to the general corridors being defined, the Authority, in consultation with FRA, developed an initial set of potential HST alignment, station, and technology options at the beginning of the screening evaluation process. These options for the LOSSAN region are illustrated, defined and described in detail in the *Screening Report* (reference) and the *LOSSAN Region Alignment/Station Screening Evaluation Report*⁶.

HST Alignment/Station Screening Evaluation (Authority, 2000)

The Authority and the FRA initiated their alternatives screening process in February 2000 to identify the most reasonable and practicable HST alignment and station options for analysis in a Program EIR/EIS. The purpose of the High-Speed Train Alignments/Stations Screening Evaluation was to consider all reasonable and practical options within each corridor being investigated by the Authority and the FRA at a consistent level of analysis. This initial alignment and station evaluation was accomplished through the following key activities.

- Review of past alignment and station options identified in previous studies.
- Through the environmental scoping process, identification of alignment and station options not previously evaluated.
- Evaluation of alignment and station options using standardized engineering, environmental, and financial criteria and evaluation methodologies.
- Evaluation of the ability of alignment and station options to attain defined objectives.

The state was divided into five geographic regions or travel markets for the purposes of evaluating high-speed train alignment and station options: Bay Area to Merced; Sacramento to Bakersfield; Bakersfield to Los Angeles; Los Angeles to San Diego via the Inland Empire; and Los Angeles to San Diego via Orange County (LOSSAN). Previous Authority studies were reviewed and re-assessed to develop HST alignment and stations options in the five regions.

⁵ California High-Speed Train - Statewide Scoping Report, April 2002

⁶ LOSSAN Region Alignment/Station Screening Evaluation Report, January 2004

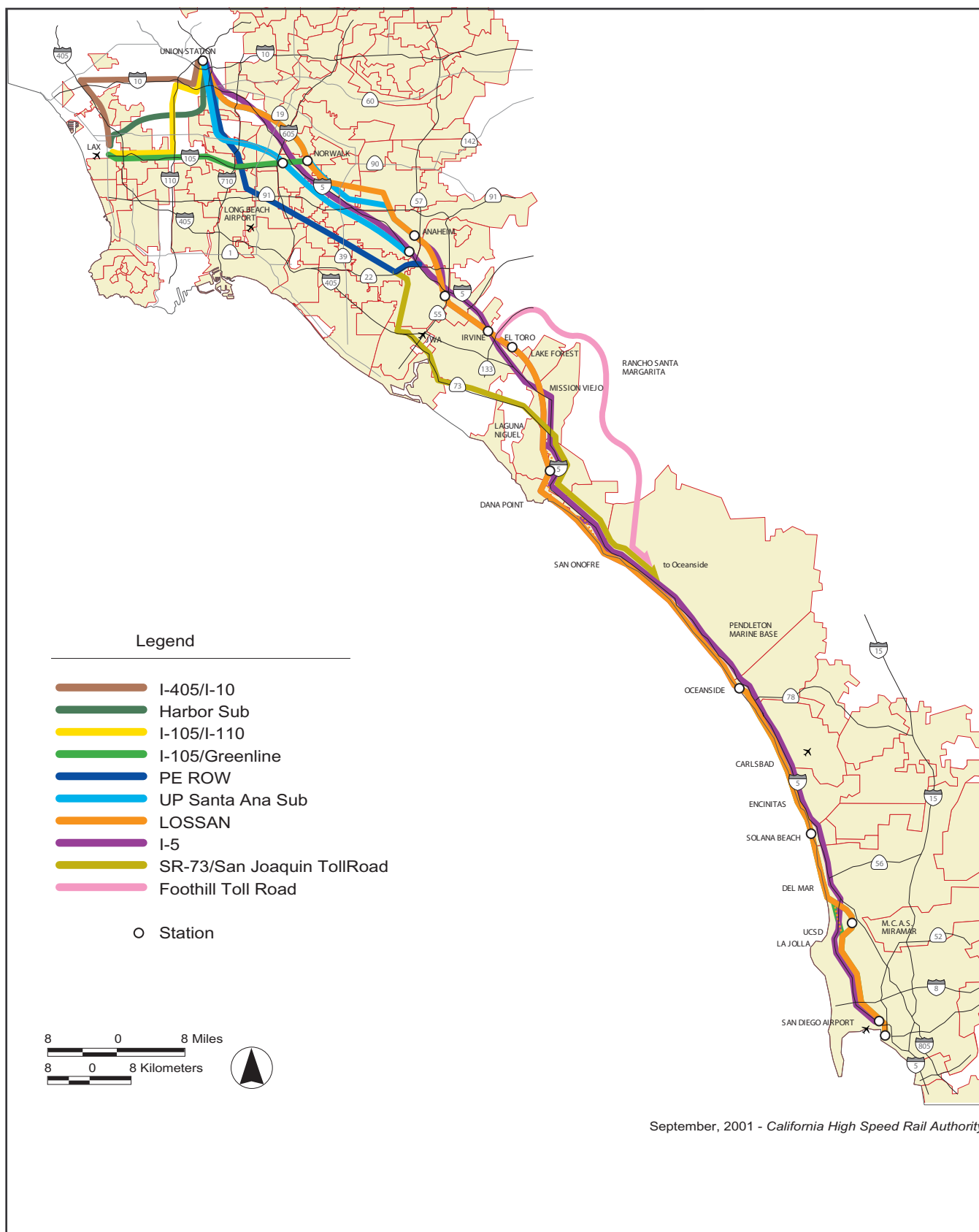
The results of the High-Speed Train Alignment/Stations Screening Evaluation were documented in five regional reports. The technical data from these reports, combined with public and agency input, provided the Authority and FRA with the necessary information to direct further studies on those alignments and station locations that represent a reasonable range of alternatives to attain the following objectives established by the Authority and FRA.

- Maximize ridership/revenue potential.
- Maximize connectivity and accessibility.
- Minimize operating and capital costs.
- Maximize compatibility with existing and planned development.
- Minimize impacts to natural resources.
- Minimize impacts to social and economic resources.
- Minimize impacts to cultural resources.
- Maximize avoidance of areas with geological and soils constraints.
- Maximize avoidance of areas with potential hazardous materials.

Input from agencies and the public was incorporated into the screening of alternatives and alignment/station options. For the LOSSAN region, the Department concurred with the analysis and the recommended screening decisions. The alignment alternatives analyzed for the LOSSAN corridor are illustrated in Figure 2.1-3. The results of the detailed screening evaluation are described in the *California High-Speed Train Screening Report*⁷, which was presented to the public at the Authority Board Meetings in August 2001 through January 2002.

At the Authority's January 2002 Board Meeting, board members reviewed the process and results and voted to identify the alternatives that would be considered in the HST Program EIR/EIS. The Board recommended a number of alignment and station options for further consideration in the program level environmental analysis. The LOSSAN corridor is recognized as an important conventional-rail feeder system to the statewide HST system, and the portion of the corridor from Los Angeles to Irvine is still under consideration as a preferred concept for direct High-Speed Train service. The FRA and federal agencies concurred with the recommendation for alternatives to be evaluated as part of the Authority's environmental review process. The Department also concurred, and initiated a separate environmental process to further evaluate the LOSSAN corridor rail improvements project.

⁷ California High-Speed Train Alignment/Station Screening Evaluation Report, 4-15-02



Source: IBI Group

FIGURE 2.1-1

Alignment Alternatives Evaluated in HST Screening Report

LOSSAN Rail Corridor Improvements

Program Environmental Impact Report / Environmental Impact Statement



U.S. Department of Transportation
Federal Railroad Administration

B. LOSSAN RAIL CORRIDOR IMPROVEMENTS PROJECT

Following the Authority's regional screening evaluations for its HST alternative corridors, the Department and the Authority agreed to share technical data and analysis for the continued evaluation of the LOSSAN corridor as a conventional rail feeder system to the statewide HST system. The Department and FRA initiated a separate environmental process for the LOSSAN Rail Corridor Improvements Program EIR/EIS, described below.

The development of alternatives to be evaluated in the LOSSAN Rail Corridor Improvements Program EIR/EIS was based on all previous work related to the statewide High-Speed Train Project as well as the two state rail plans described previously. The formal environmental process for the LOSSAN corridor began in early 2002, and included public and agency coordination and scoping, on-going agency involvement and working groups, and development of a Strategic Plan for the LOSSAN corridor.

Public and Agency Coordination and Scoping

The Department's early definition of the project and characterization of a feasible range of alternatives to be carried forward in this LOSSAN Rail Corridor Improvements Program EIR/EIS involved frequent coordination with public agencies and the general public. Prior to the Department's separate environmental process initiation, potential improvements to the LOSSAN corridor had been included in the agency and public involvement processes sponsored by the Authority.

Additional agency and public input was obtained during the Department's scoping process pursuant to CEQA and NEPA requirements. The Department's Notice of Preparation (NOP) was released March 11, 2002, and the Notice of Intent (NOI) was published in the Federal Register on March 20, 2002. Written responses were received from interested parties in response to these notifications. The scoping activities for the LOSSAN Rail Corridor Improvements Program EIR/EIS were conducted between April 2 and April 30, 2002 (scoping period). A LOSSAN regional agency and public scoping meeting was held on April 2, 2002 in Los Angeles to obtain public and agency input. A series of six additional scoping meetings followed throughout the region as well as other meetings, briefings, and involvement activities conducted jointly by the Department and the Authority.

The scoping process identified areas of potential concern related to the proposed LOSSAN corridor improvements. Throughout the corridor, comments consistently indicated the need for an improved transportation system focusing on safety and new alignments located away from environmentally sensitive areas. The concerns with respect to environmental issues typically focused on potential noise and visual impacts, and impacts on air quality and sensitive habitats. The scoping process and outcomes are documented in the *LOSSAN Proposed Rail Corridor Improvements Study – Public Scoping Report*⁸.

⁸ California Department of Transportation (?) – LOSSAN Corridor Improvements Study - Public Scoping Report, June 2002

Agency Involvement

Following the response to the NOP and NOI, and a series of public scoping meetings, the Department and FRA (as the lead CEQA and NEPA agencies responsible for the preparation of the Program EIR/EIS) formed a working group of representatives comprised of eight key federal and state agencies to assist in the environmental review process. The interagency group has met periodically during the EIS/EIR development to discuss major issues from the perspective of each of their agencies and to provide input to the lead agencies and consultant team to help focus the analysis and streamline the review process. The federal and state agency representatives have been included in this process to provide input and timely review for the following specific areas:

- Define the scope of the Program EIR/EIS
- Review and provide input to the Purpose and Need Statement
- Review and provide input to the technical methods of analysis and study area definition
- Identify substantive issues of particular concern
- Suggest sources of information and data relevant to their agency
- Define avoidance, minimization and mitigation strategies
- Review and provide input to the screening process and definition of alternatives to be analyzed in this EIR/EIS
- Review and provide input on preliminary findings pertinent to agency expertise
- Identify procedural requirements and permits or approvals necessary for subsequent phases of environmental review.

The Department, together with FRA and the Authority, also invited input from regional and local agencies within the project area. Regional transportation agency Board meetings and working-group meetings have provided forums for discussion of the environmental process and the development of alternatives that could meet travel needs in the LOSSAN region. These meetings have been held in San Diego, Oceanside, Orange County and Los Angeles to provide convenient on-going opportunities for regional and local participation and input.

As a result of early public involvement, the following additional routing options were developed:

- Trabuco Creek (San Juan Capistrano)
- Long Tunnel (Dana Point/San Clemente)
- South Orange County Inland Bypass
- Penasquitos Lagoon Bypass

LOSSAN Strategic Plan

Based on the *Authority's System Alternatives Definition Report*, the Department and FRA defined a No-Project/No-Action Alternative specific to the LOSSAN corridor, to be evaluated in the LOSSAN Rail Corridor Improvements Program EIR/EIS (see Section 2.3). Inclusion of a Modal Alternative (highway and airport expansion) was also considered. However, in discussions with resource agencies and transportation agencies, the Department and FRA determined that evaluation of a Modal Alternative for this Program EIR/EIS was not relevant, based on the Purpose and Need for the LOSSAN-specific project. As stated in Chapter 1, the Department has described its overall objectives and policies for intercity rail improvements in the current State Rail Plan (2002). These include increasing the cost-effectiveness of State-supported intercity passenger rail systems, increasing capacity and reducing running time on existing routes, and improving safety of intercity rail service. The need for these improvements to rail service between Los Angeles, Orange County and San Diego is demonstrated by growth and travel-demand projections, existing rail capacity constraints in the LOSSAN corridor, continuing air quality issues, and pressures on natural resources from highway construction, motor vehicle use, and congestion. An alternative involving highway and airport expansion would not address either the purpose of or the need for rail improvements in the LOSSAN region. While it is appropriate to evaluate a Modal Alternative in comparison to a statewide rail proposal such as the Authority's High-Speed Train Project, the Department and FRA determined that the region-specific needs addressed in this Program EIR/EIS relate to existing and future intercity rail service currently served via the LOSSAN corridor. Therefore, a Modal Alternative is not examined in this document.

The Department defined rail improvement alignment and station options based on the Authority's previous screening evaluation for the LOSSAN region, the LOSSAN scoping comments and meetings, and additional refinement studies conducted by the Department and the Authority.

After the initial definition of alignment and station alternatives, the Department determined that the creation of a Strategic Plan would be a useful step in its ongoing Program EIR/EIS process for studying conventional rail improvements for the LOSSAN corridor. This complementary planning document looked at the proposed rail improvements from a corridor-wide perspective. In supporting the EIR/EIS work, the Strategic Plan met the Department objectives listed below.

- Provide an additional opportunity for public outreach, beyond that provided as part of the EIR/EIS process.
- Foster better communication and understanding among stakeholders at all levels.
- Provide an opportunity to screen out design options at key locations, so as to focus future work on the most promising alternatives.
- Develop short- and long-term visions for the corridor, contemplating a program of projects for the next twenty years.

The Strategic Plan met these objectives through a series of five public workshops held in cities along the corridor. The workshops provided the public with an overview of the

corridor and the rail improvements under study, including information on the following topics.

- The purpose and goals of the Strategic Plan.
- The need for improvements to the corridor.
- Current and projected weekday train volumes.
- Corridor facts, including rail owners and operators and details on freight services.
- Types of services provided (Intercity Rail, Commuter Rail, and Freight).
- Ranges of costs, rail performance issues, and community/environmental issues of projects throughout the corridor.
- Design options and alternatives at four key locations along the corridor where the range of options was sufficiently broad to allow the screening out of some options, the recommendations for screening, and the rationale and criteria used to reach the recommended screening decisions.
- The Planning Process, including timelines for the completion of the Strategic Plan and the Department's Draft Program EIR/EIS.

In addition to the public workshops, meetings were held with elected representatives and staff of corridor cities, working groups consisting of transportation agencies and other stakeholders, resource agencies at the state and federal level, FRA and the Authority. These meetings helped to foster a collective sense of understanding regarding the corridor, its current and future needs, and how the proposed improvements could not only meet train service and performance goals, but could offer solutions to long-standing issues of community and environmental concern.

Through the consultative process used in the development of the Strategic Plan, new alignments were presented by local working groups, leading to additional design options. The Strategic Plan process also resulted in the screening of design options at four locations (Del Mar, Encinitas, San Clemente/Dana Point, and San Juan Capistrano), and provided an evaluation of whether or not to conduct an Inland Bypass Alternative Study. Results of the process are documented in the LOSSAN Strategic Plan.⁹

A description of the alternatives rejected from further consideration and those carried forward for evaluation in this Program EIR/EIS are detailed in the following sections.

2.2 SUMMARY OF ALTERNATIVES CONSIDERED

During this Program-level study, numerous alternatives have been considered. Some have been eliminated based on analyses conducted during previous studies, while others were added or eliminated during the development of the Department's LOSSAN Corridor Strategic Plan.

Table 2.2-1 provides a summary of all alternatives considered, and their status (eliminated or carried forward for further study):

⁹ Los Angeles to San Diego Proposed Rail Corridor Improvements Studies, LOSSAN Corridor Strategic Plan, June 2003

**Table 2.2-1
Summary of All Alternatives Considered**

Alternative Considered	Eliminated Based on Previous Studies	Eliminated in Strategic Plan	Carried Forward in EIR/EIS	Further Discussion in Section
No Build/No Action Alternative			X	2.4
Dedicated High-Speed Rail in the LOSSAN Right-of-Way	X			2.3.1 A
LA Union Station to Central Orange County (Anaheim)				
Interstate 5 Freeway	X			2.3.1 B
Pacific Electric Right-of-Way	X			2.3.1 B
Union Station Run-through Tracks (Los Angeles)			X	2.4.2
Addition of Fourth Main Track (Commerce to Fullerton)			X	2.5.1
Station Locations				
Paramount (San Pedro Branch at I-105)	X			2.3.1 B
Norwalk (I-5 at Imperial Highway)	X			2.3.1 B
Garden Grove (PE ROW at SR-22)	X			2.3.1 B
Central Orange County (Anaheim) to Oceanside				
Interstate 5 Freeway	X			2.3.1 B
San Joaquin Corridor (SR-73) with I-5	X			2.3.1 B
Foothill South Corridor (SR-241)	X			2.3.2 B
Double-tracking and Curve Straightening – including partial or full Grade Separation (Fullerton to Irvine)			X	2.5.1
Dedicated High-Speed Rail or MAGLEV South of Irvine	X			2.3.1 C
At-grade double-tracking in existing rail alignment (San Juan Capistrano)		X		2.3.2 A
<u>Downtown Cut-and-Cover Tunnel (San Juan Capistrano)</u>		X		2.3.2 B
I-5 Tunnel (San Juan Capistrano)			X	2.5.1
Trabuco Creek Cut-and-Cover Tunnel (San Juan Capistrano)			X	2.5.1
At-grade double-tracking in existing rail alignment (Dana Point/San Clemente)		X		2.3.2 A
<u>Short Trench (Dana Point/San Clemente)</u>		X		2.3.2 B
Long Trench (Dana Point/San Clemente)		X		2.3.2 B
Long Single Tunnel - no station in San Clemente (Dana Point/San Clemente)		X		2.3.2 B

Alternative Considered	Eliminated Based on Previous Studies	Eliminated in Strategic Plan	Carried Forward in EIR/EIS	Further Discussion in Section
South Orange County Inland Bypass		X		2.3.2 B
<u>Short Tunnel – I-5 (Dana Point/San Clemente)</u>			X	2.5.1
<u>Long Split Tunnel with station in San Clemente (Dana Point/San Clemente)</u>			X	2.5.1
Station Locations				
Irvine (I-5 at Jeffery Road)	X			2.3.1 B
Oceanside (I-5 at Oceanside Boulevard)	X			2.3.1 B

Alternative Considered	Eliminated Based on Previous Studies	Eliminated in Strategic Plan	Carried Forward in EIR/EIS	Further Discussion in Section
Oceanside to San Diego				
Interstate 5 Freeway	X			2.3.1 B
Double-tracking in existing alignment (Camp Pendleton)			X	2.5.1
Double-tracking in existing alignment, including partial or full Grade Separation (Oceanside to Carlsbad)			X	2.5.1
At-grade double-tracking in existing rail alignment (Encinitas)		X		2.3.2 A
At-grade double-tracking with Grade Separations (Encinitas)			X	2.5.1
Short Trench (Encinitas)			X	2.5.1
Long Trench (Encinitas)		X		2.3.2 B
At-grade double-tracking in existing rail alignment (Del Mar)		X		2.3.2 A
Trench in Bluffs (Del Mar)		X		2.3.2 B
Camino del Mar Tunnel #1 (Del Mar)			X	2.5.1
Camino del Mar Tunnel #2 (Del Mar)		X		2.3.2 B
Penasquitos Lagoon Bypass Tunnel			X	2.5.1
Tunnel under I-5 at University Towne Centre			X	2.5.1
Tunnel under Miramar Hill at University Towne Centre			X	2.5.1
Double-tracking and Curve Straightening – including partial or full Grade Separation (San Diego – State Route 52)			X	2.5.1 B
Station Locations				
Solana Beach (I-5 at Lomas Santa Fe Dr.)	X			2.3.1 B

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED

This section summarizes the alternative train technologies, corridors, and alignment and station options that have been evaluated for the LOSSAN region and eliminated from further consideration in this Program EIR/EIS. The reasons for the elimination of these alternatives are also briefly described. The options carried forward for further evaluation are described in Section 2.4.

The Department conducted a comprehensive screening of alternatives during the scoping period for its environmental process and during preparation of the LOSSAN Strategic Plan (2003). However, as described in the previous section, the Department also reviewed and concurred with previous decisions regarding the LOSSAN region made by the Authority in its

studies related to a statewide high-speed train system. This previous work led to the elimination of some initial design options, train technologies, and several potential rail corridors within the LOSSAN region. The Department adopted these decisions and, therefore, eliminated the same options from further evaluation in this Program EIR/EIS. To provide a complete history of alternatives considered and eliminated, previous decisions from statewide high-speed train studies that applied to the LOSSAN region are first described below in Section 2.3.1. Section 2.3.2 describes the rail improvement alignments and design options within the LOSSAN rail corridor considered and eliminated during the Department's scoping and strategic planning efforts.

2.3.1 Alternatives Eliminated in LOSSAN Region Based on Previous Studies

A. LOSSAN CORRIDOR DEDICATED HIGH-SPEED TRAIN SERVICE

A dedicated HST system utilizing the LOSSAN rail corridor was investigated by the High-Speed Rail Commission and its successor the Authority. Based on the Commission's and Authority's work, the Department concluded that a dedicated HST corridor with completely separate tracks for the HST service was impracticable in the severely constrained LOSSAN corridor.

The existing LOSSAN rail corridor is the second-most traveled rail passenger route in the United States. In addition to Amtrak's intercity service, there are also two thriving commuter rail services (Metrolink and Coaster) operating on this corridor, as well as a significant amount of freight traffic. Although the corridor provides the most direct rail route between Los Angeles and San Diego, it passes through some of the state's most populated regions and environmentally sensitive areas (wetlands, coastal lagoons, fragile coastal bluffs, and coastal communities).

The technical investigations and public input during the Commission's feasibility studies identified significant environmental obstacles to implementing a dedicated HST service along the LOSSAN corridor. Comments received during the Authority's study (as well as during the 1996 feasibility study by the Commission) raised the following issues:

- The bluffs are narrow in some areas and susceptible to failure, in particular the Del Mar Bluffs. Steel-wheels-on-steel rails would cause noise and vibration problems that would be dangerous to the fragile bluffs above the beach.
- The existing right-of-way is narrow and currently divides Encinitas. Additional service in the corridor could restrict access to and enjoyment of the beach area by visitors and residents.
- To prevent dangerous pedestrian crossings of the HST tracks, the railroad rights-of-way would be fenced. This would block beach access and concentrate the crossing of pedestrian and vehicle traffic to fewer locations.
- Noise and vibration from trains would be disruptive to ecologically sensitive coastal areas and lagoons. The saltwater marshes and lagoons are a winter habitat for several sensitive bird species.
- A dedicated right-of-way would require two more tracks at-grade (with fencing) or a double-deck configuration, to accommodate existing rail services and high-speed

rail. In Encinitas, there may not be room in the existing right-of-way to add two more tracks at grade, so this could mean a double-deck configuration. The structures and overhead catenaries could block highly sensitive ocean and community views, creating a negative aesthetic impact on tourism-related businesses and potentially reducing property values adjacent to the corridor.

B. HIGH-SPEED TRAIN CORRIDORS AND STATION OPTIONS

Evaluation Objectives and Criteria for High-Speed Train Project Corridors

The range of alternative corridors and station options identified by the Authority and FRA and concurred with by the Department were evaluated against a list of objectives and criteria. These objectives and criteria built upon previous studies and incorporated performance goals and criteria described in Section 2.1. No formal thresholds were applied; instead, alignment and station options were compared based on these objectives and criteria. Table 2.3-1 presents the objectives and criteria applied by the Authority and FRA.

These objectives and criteria were also used as a base for the development of the criteria used by the Department and FRA for the screening of potential incremental improvement alternatives in its LOSSAN Corridor Strategic Plan.

Table 2.3-1
High-Speed Rail Corridor/Station Evaluation Objectives and Criteria

Objective	Criteria
Maximize ridership/revenue potential	Travel time Length Population/employment catchment
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Length Operational issues Construction issues Capital cost Right-of-way issues/cost
Maximize compatibility with existing and planned development	Land use compatibility and conflicts Visual quality impacts
Minimize impacts on natural resources	Water resources impacts Floodplain impacts Wetland impacts Threatened and endangered species impacts Wildlife corridor impacts
Minimize impacts on social and economic resources	Environmental justice impacts (demographics) Farmland impacts
Minimize impacts on cultural resources	Cultural resources impacts Parks and recreation impacts Wildlife refuge impacts

Objective	Criteria
Maximize avoidance of areas with geologic and soils constraints	Soils/slope constraints Seismic constraints
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints

The screening evaluation criteria focused on cost and travel time as primary indicators of engineering viability and ridership potential. Items such as capital costs and travel times were quantified for each of the alignment and station options considered. Other engineering criteria such as operational, construction, and right-of-way issues were evaluated qualitatively.

C. RAIL TECHNOLOGY

Four primary technology groups were initially considered in the development of the statewide high-speed train system, as listed below.

- Electrified Very High-Speed Steel-Wheel-On-Steel-Rail.
- Magnetic Levitation.
- High-Speed Steel-Wheel-On-Steel Rail.
- Non-Electrified Steel-Wheel-On-Steel-Rail (Conventional).

Because of the need for early implementation, other less developed technologies (those not currently in operation or ready for implementation) were not considered.

In the *Authority's High-Speed Train Screening Evaluation Report*, these technologies were evaluated against known operational and environmental constraints. As stated above, the studies by the Authority rejected the alternative of dedicated rail service in the existing LOSSAN corridor, as well as dedicated service in the I-5 corridor. The Authority subsequently determined (and the Department concurred) that the two technologies that require dedicated infrastructure would need to be eliminated from further consideration in the LOSSAN corridor south of either Anaheim or Irvine -- Electrified Very High Speed (VHS) Steel-Wheel-On-Steel-Rail, and Magnetic Levitation.

D. RAIL CORRIDORS CONSIDERED AND ELIMINATED IN LOSSAN REGION

This section describes previous work performed in the Los Angeles-Orange County-San Diego region (LOSSAN region) and considered by the Department and FRA to eliminate certain alternative corridors and station options from further consideration. Reviewing this work is essential in understanding the reasons for the Department's selection of the rail improvement alternatives that have been carried forward for consideration within the LOSSAN corridor.

As part of the initial alternatives developed, the Authority had looked at the feasibility of high-speed train service along several corridors through the LOSSAN region. A number of alignment and station options were further analyzed by the Authority in a subsequent screening evaluation for the region (Authority 2000), and this analysis was utilized by the

Department in its considerations, and its findings presented in the LOSSAN Corridor Strategic Plan. These options are summarized below.

The alignments and stations considered and eliminated for this region are shown in Figure 2.3.1-1. The reasons for elimination of each of the options are categorically summarized in Table 2.3-2 and further described in the subsections that follow.

**Table 2.3–2
Alternative HST Corridor Alignments and Station Options Considered but
Eliminated for the LOSSAN Region**

Alignment or Station	Reason							
	Construction	Environment	Incompatibility	Right of Way	Connectivity/ Accessibility	Revenue/ Ridership	Alignment Eliminated	Environmental Concerns
LA Union Station to Central Orange County (Anaheim)								
Interstate 5 Freeway	P			P				
Pacific Electric Right-of-Way	P		S					
<i>Station Locations</i>								
Paramount (San Pedro Branch at I-105)							P	
Norwalk (I-5 at Imperial Highway)							P	
Garden Grove (PE ROW at SR-22)							P	
Central Orange County (Anaheim) to Oceanside								
Interstate 5 Freeway	P			P				
San Joaquin Corridor (SR-73) with I-5	P				S			
Interstate 5 and Foothill Corridor (SR-241)	P	S						Natural resources
<i>Station Locations</i>								
Irvine (I-5 at Jeffery Road)							P	
Oceanside (I-5 at Oceanside Boulevard)							P	
Oceanside to San Diego								
Interstate 5 Freeway	P	S	S	P				Visual
<i>Station Locations</i>								
Solana Beach (I-5 at Lomas Santa Fe Dr.)							P	
San Diego Airport								
Notes: Reason: Primary (P) and Secondary (S) reasons for elimination. Construction: Includes engineering and construction complexity, cost and sub-optimal systems operations influence (i.e., slow train speeds). Environment: Includes any factor that can be assigned to the environmental disciplines studied as part of this EIR/EIS. Incompatibility: Incompatibility with current or planned local land use. Right-of-Way: Includes lack of available rights-of-way, extensive right-of-way needs, and high cost. Connectivity/Accessibility: Includes limited connectivity with other existing or future transportation modes (highway and/or transit systems). Ridership/Revenue: The alignment or station would have a negative effect on the revenue or ridership for the system. Alignment Eliminated: Station or connection eliminated because the connecting alignment option was eliminated. Environmental Concerns: Notes of specific environmental areas of concern.								

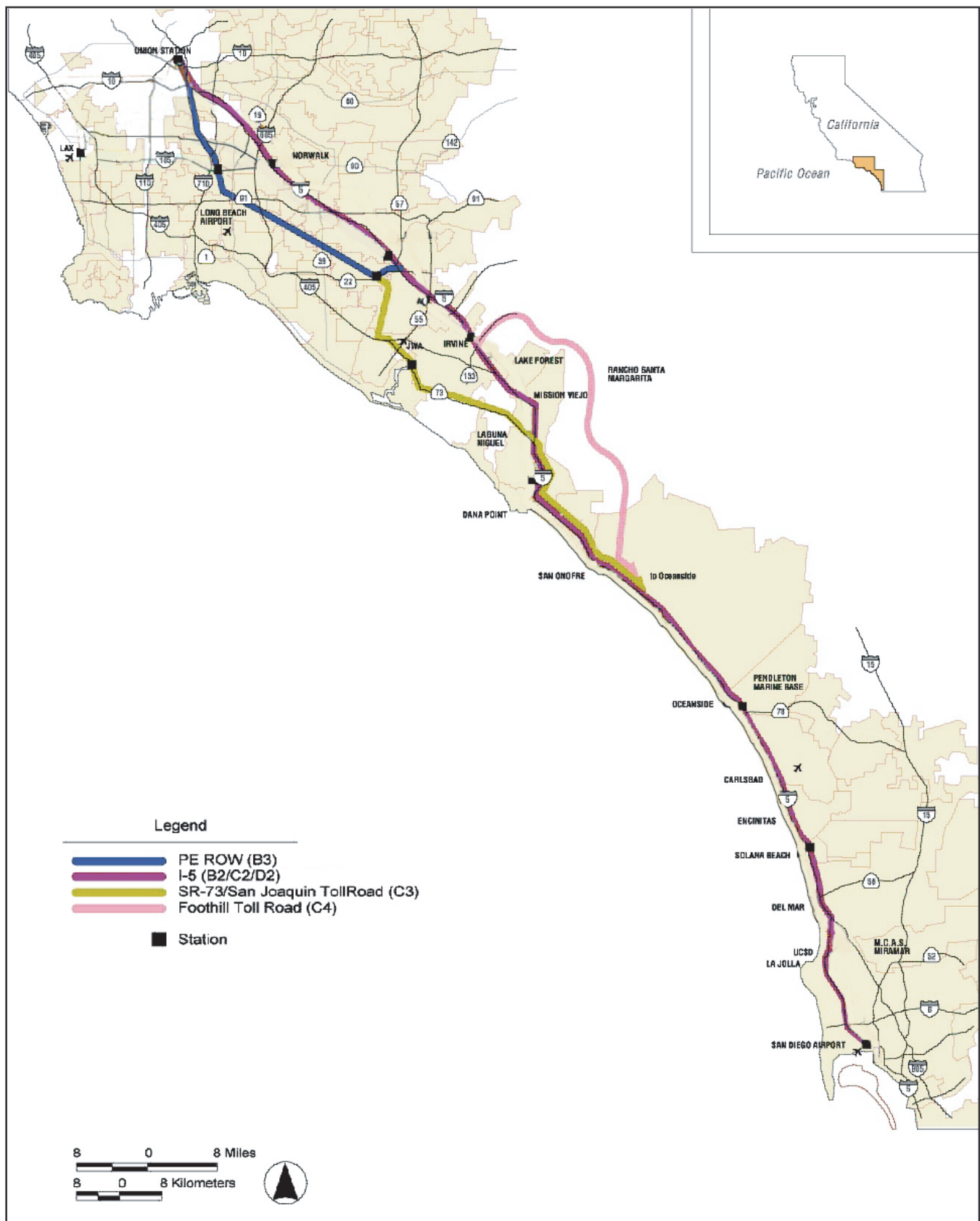


FIGURE 2.3.1-1

Alternative HST Corridor Alignments and Station Options Considered but Eliminated for the LOSSAN Region

LOSSAN Rail Corridor Improvements

Program Environmental Impact Report / Environmental Impact Statement



U.S. Department of
Transportation
Federal
Railroad
Administration

Los Angeles to Central Orange County

- **Interstate 5 Freeway** - This alignment would follow I-5 south of the US-101/I-5/I-10/SR-60 interchange (East LA interchange) and involve a dedicated bypass of the freight and commuter rail corridor, and a reasonably direct alignment to central Orange County and on to San Diego.

In this segment, the I-5 Freeway alternative would be a very slow rail route due to the number and size of curves on the I-5 alignment. It would be impracticable as a result of high costs and due to extremely constrained right-of-way in the corridor, which would require construction of high aerial structures. It would provide a Central Orange County station in Anaheim, which would have good freeway access and intermodal transit connections. Third or fourth level aerial construction would be required along I-5 due to elevated freeway sections and freeway interchanges along this right-of-way. This freeway alignment would also require relocating and maintaining freeway access and capacity during construction. Available space along this freeway alignment would be limited since available right-of-way is generally planned for use for needed expansion projects such as additional lanes, HOV lanes, and additional interchange improvements.

- **Pacific Electric (PE) Right-of-Way** – This alignment would be along a lightly-used rail line between the cities of Paramount and Stanton, and an abandoned corridor through to Santa Ana. Its long, straight (tangent) sections could support HST operation.

The PE right-of-way would provide for reasonably fast travel times, due primarily to its straightness. This alternative would not meet the Department's objectives since it would not provide sufficient accessibility and connectivity, because it would be convenient only to a single freeway and it would not directly serve major Orange County Transportation Hubs (in Anaheim and Irvine) and because of its incompatibility with local land uses.

Central Orange County to Oceanside

- **Interstate 5 Freeway** – This alignment would continue from Anaheim along I-5 in Orange County through Camp Pendleton to Oceanside, providing a dedicated high-speed alignment and bypassing constrained sections of the LOSSAN corridor.

In this segment, the I-5 alternative would be a fast rail route but also very costly, since the number and size of horizontal and vertical curves on I-5 would require extensive aerial and tunnel construction to maintain speeds. Third or fourth level aerial construction would be required along much of I-5 due to elevated freeway sections and freeway interchanges along this right-of-way. This freeway alignment would also require relocating and maintaining freeway access and capacity during construction. Available space along this freeway would be limited, since virtually all available right-of-way has been used for recent expansion projects such as additional lanes, HOV lanes, viaduct structures, and additional interchange improvements. This option would avoid sensitive areas in San Juan Capistrano and San Clemente, but would result in potential land use impacts alongside the I-5 corridor, which is abutted by commercial and industrial uses in both areas. This option is considered to be impracticable due to high construction issues and costs, and high right-of-way constraints.

- San Joaquin Corridor (SR-73) with Interstate 5 - This option would provide a dedicated alignment, continuing from the PE right-of-way in Garden Grove. This is a southern highway alternative to the I-5 Freeway option (which would follow I-5 through Santa Ana, Tustin, and Irvine), and would pass through some less developed parts of Orange County.

The SR-73 alternative would be almost as expensive as the I-5 Freeway option. Due to its rolling terrain, it would require extensive tunneling. The SR-73 alternative would not be as accessible as the LOSSAN and I-5 Freeway alternatives, since it would be convenient to only a single freeway. Moreover, this alternative would not serve either Anaheim or Irvine and it would only connect to the PE right-of-way alignment (between Union Station and Central Orange County) that has been eliminated from further evaluation. This option would not meet basic connectivity and accessibility objectives and was considered impracticable due to high right-of-way constraints and high construction impacts and costs.

Oceanside to San Diego

- Interstate 5 Freeway – This alignment would continue from Oceanside along I-5 to San Diego, providing a dedicated high-speed alignment and bypassing sensitive coastal and other constrained sections of the LOSSAN corridor. This would provide the only option for a dedicated rail alignment along the coast in San Diego.

In this section, the I-5 Freeway dedicated option would provide a travel time similar to the LOSSAN options, but it would not serve the downtown Santa Fe Depot and would terminate at the San Diego Airport. I-5 would be a very costly option, since the number and size of horizontal and vertical curves on I-5 require extensive aerial structures to maintain speeds. Third or fourth level aerial construction would be required along much of I-5 due to elevated freeway sections and freeway interchanges along this right-of-way. This freeway alignment would also require relocating and maintaining freeway access and capacity during construction. Available space along this freeway alignment is limited, since available right-of-way is generally planned for use for needed expansion projects such as additional lanes, HOV lanes, and additional interchange improvements.

This option would avoid sensitive coastal areas. However, in many places, particularly at lagoon crossings, it would share many of the environmental issues and sensitivities of the coastal areas of the LOSSAN corridor. Due to the constrained right-of-way along the I-5 corridor, there would be potential property impacts on adjacent land uses, which are largely commercial and industrial but include significant residential areas. Due to the need for aerial construction, there would be significant potential for visual intrusion, including interference with ocean and lagoon views.

Suitable land for station sites on the I-5 alignment would be scarce, and the development of such new stations would be incompatible with the emerging Smart Growth principles of San Diego County, which stress the support and development of existing transportation hubs. Therefore, this alternative is not as compatible with the existing and planned development of the coastal cities as the LOSSAN corridor.

The I-5 alignment investigation assumed that the infrastructure would be exclusively used by a proposed HST system. Therefore, with the existing rail impacts for freight and commuter rail in the LOSSAN corridor and a new proposed HST system, there would be

two parallel rail lines. The cumulative impacts of the two corridors would be far greater than a single alternative along the LOSSAN corridor. Combining the existing rail services and a proposed HST system in a completely new corridor with new infrastructure, which would not be fully dedicated to high-speed service, would increase costs and diminish the performance of the proposed HST system and result in extensive costs for the relocation of all existing Amtrak, freight, and commuter rail stations into the I-5 corridor. Moreover, a proposed HST system along the I-5 Freeway would cause significant disruption to abutting land uses (and increase environmental impacts), and would result in greatly increased costs of building the infrastructure because of additional commuter stations, additional track requirements, and restrictive freight gradients.

This option would not meet basic program objectives and would not avoid or substantially reduce environmental impacts. It was considered impracticable due to high right-of-way constraints and high construction impacts and costs.

Stations Locations Eliminated in LOSSAN Region

- Paramount (San Pedro Branch at I-105): This potential station site would only serve the PE Right-of-Way alternative that has been eliminated from further investigation.
- Norwalk (I-5 at Imperial Highway): This potential station site would only serve the Interstate 5 Freeway alternative that has been eliminated from further investigation.
- Garden Grove (PE right-of-way at SR-22): This potential station site would only serve the PE right-of-way alternative that has been eliminated from further investigation.
- Irvine (I-5 at Jeffrey Road): This station would only serve the I-5 Freeway and I-5 and Foothill Corridor alternatives that have been eliminated from further investigation.
- Oceanside (I-5 at Oceanside Boulevard): This station would only serve the I-5 Freeway, I-5 and Foothill, and SR-73 and I-5 alternatives that have been eliminated from further investigation.
- Solana Beach (I-5 at Lomas Santa Fe Drive): This potential station would serve only the I-5 alignment that has been eliminated from further evaluation.
- San Diego Airport: This LOSSAN station would serve San Diego and the San Diego Airport with an improved Amtrak service and could be expanded to serve new express intercity services.

2.3.2 LOSSAN Corridor Rail Improvements Considered and Eliminated

The Department and FRA considered a number of conventional rail improvements for the LOSSAN corridor. Improvement options that were eliminated from evaluation in this Program EIR/EIS are summarized in Table 2.3.2-1 and described below. More detail on the screening of alternatives can be found in the LOSSAN Corridor Strategic Plan¹⁰.

¹⁰ Full reference

**Table 2.3.2-1
LOSSAN Corridor Rail Improvement Alternatives Eliminated**

Alignment or Station	Reason							Environmental Concerns
	Construction	Environment	Incompatibility	Right of Way	Connectivity/ Accessibility	Revenue/ Ridership	Train Performance	
San Juan Capistrano								
At-grade double-tracking in existing rail alignment		P	P	P				Historic resources
Downtown Cut-and-Cover Tunnel	P		P					
Dana Point/San Clemente								
At-grade double-tracking in existing rail alignment	P		P					
Short Trench	P	P	P				S	Beach aesthetics & access
Long Trench	P	P	P	S				Beach aesthetics & access
Long Single Tunnel (no station in San Clemente)	P					S		
Inland Bypass	P	P	S		P	P	P	Natural resources
Encinitas								
At-grade double-tracking in existing rail alignment	P		P					
Long Trench	P							
Del Mar								
At-grade double-tracking in existing rail alignment	P		P	P				
Trench in Bluffs	P	P	P	S				Beach aesthetics & access
Camino del Mar Tunnel #2		P	S	P				New crossing of lagoon
Notes:								
Reason: Primary (P) and Secondary (S) reasons for elimination.								
Construction: Includes engineering and construction complexity, cost and sub-optimal systems operations influence (i.e., slow train speeds).								
Environment: Includes any factor that can be assigned to the environmental disciplines studied as part of this EIR/EIS.								
Incompatibility: Incompatibility with current or planned local land use.								
Right-of-Way: Includes lack of available rights-of-way, extensive right-of-way needs, and high cost.								
Connectivity/Accessibility: Includes limited connectivity with other existing or future transportation modes (highway and/or transit systems).								
Ridership/Revenue: The alignment or station would have a negative effect on the revenue or ridership for the system.								
Train Performance: Includes impacts to reliability, running time improvement, and ability to accommodate freight.								
Environmental Concerns: Notes of specific environmental areas of concern.								

A. PRELIMINARY LOSSAN CONVENTIONAL IMPROVEMENTS OPTIONS ELIMINATED FROM FURTHER EVALUATION

The community and environmental sensitivities and engineering challenges in the Cities of Del Mar, Encinitas, San Clemente and San Juan Capistrano are distinctive and sometimes unique to one community. Nevertheless, the four share one common constraint: an environment of high pedestrian traffic, where the existing LOSSAN railway acts as an impediment to access between most of the community and a desirable

community resource, and yet the railway is accessible enough that people are not channeled to designated crossing points featuring gates and warning devices.

In these areas, simple at-grade double-tracking was considered early in the definition of alternatives. However, introducing extensive sections of double-track in such environments, without providing a significant expansion of the ability for pedestrians to safely cross over or under the tracks, would not improve safety for rail users or those wishing to cross the corridor. Without new grade-separated crossing opportunities the implication is also that increased speeds through the segment most likely create unacceptable safety risks, negating much of the benefit of double-tracking.

While the concept of simple at-grade double-tracking was rejected in the four communities, it was used as a starting point in defining other alternatives along the existing alignment. The specific issues in each community that led to elimination of the option of simple at-grade double-tracking along the existing LOSSAN rail alignment are summarized below. Section 2.4 describes options that were carried forward for evaluation.

San Juan Capistrano

Up until the 1960s, downtown San Juan Capistrano featured a second passing track. This was removed by the Santa Fe Railroad, which saw it as an unnecessary maintenance burden in a time when intercity passenger travel was on the decline and commuter rail was decades away. While room is available to restore the second track at-grade, doing so would not provide any speed improvements in the high pedestrian-use area of Franciscan Plaza. Further, the presence of the Los Rios Historical District immediately to the west, with its sensitive adobe structures, eliminates the possibility of a grade-separation along the existing alignment, either by taking the rail below-grade, or by building a pedestrian underpass.

Due to physical constraints, visual and environmental issues, and community concerns, elevated railway viaduct structures (except at water crossings) along the beachfront and in the San Juan Capistrano historical area were not investigated.

San Clemente

The track at San Clemente is on the beach. As a result, trespassing onto the rail right-of-way and crossing the rails away from designated crossing points is commonplace, with pronounced safety risks. To address these safety issues, train operating speeds are greatly reduced, leading to significant capacity and performance penalties in these areas. An at-grade second track in the existing rail corridor was therefore eliminated from further consideration, since it would compound existing barrier and safety issues.

Encinitas

In Encinitas, the existing rail corridor abuts residential, commercial and industrial land uses and forms a barrier to pedestrians and to vehicular traffic at the at-grade crossings of major intersections. In Leucadia, the rail separates a residential area to the east from a major local shopping district and the coast to the west. In Cardiff-by-the-Sea, the rail corridor separates the community from the ocean. At-grade double-tracking in the existing corridor was eliminated because it would compound these barriers and create additional safety issues with pedestrian and vehicle crossings.

Del Mar

An at-grade second track along the coastal bluffs in Del Mar would compound existing barrier and safety factors noted above for other locations. In addition, since the bluffs are continually eroding, it was apparent that any double-tracking alternative in this location would require significant excavation work to stabilize the bluff-top. Stabilization would also require structures that would create substantial visual impacts and likely require significant on-going maintenance efforts to address erosion and drainage concerns. Therefore, this option was eliminated due to high construction and operational impacts and costs.

B. OPTIONS ELIMINATED IN STRATEGIC PLAN AND SCREENING EVALUATION (2003)

Based on further technical evaluation and public and agency input during the LOSSAN Corridor Strategic Plan process, rail improvement options were further screened in four locations along the corridor: San Juan Capistrano, Dana Point/San Clemente, Encinitas, and Del Mar. In addition, the Department considered the potential for a South Orange County Bypass option that would bypass San Juan Capistrano, Dana Point, and San Clemente. The options eliminated from evaluation in this Program EIR/EIS are described and illustrated below.

San Juan Capistrano

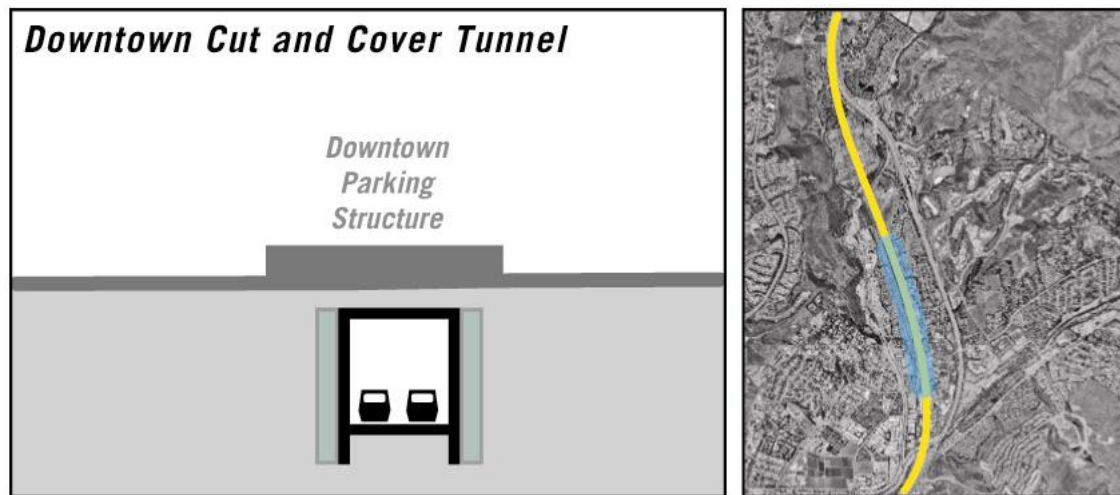
- **Downtown Cut-and-Cover Tunnel:** This option would involve construction of a cut and cover tunnel through San Juan Capistrano's downtown (see Figure 2.3.2-1). Near Junipero Serra Road, the alignment would enter a double-tracked open concrete trench. North of the existing San Juan Capistrano Depot, the trench would become a covered trench. The covered trench would pass beneath an existing downtown parking structure, and then would become an open trench again. Near San Juan Creek, the alignment would return to grade. This option would also include curve straightening the alignment just south of the San Juan Creek crossing.

The Downtown Cut-and-Cover Tunnel would have severe construction impacts and property impacts on downtown San Juan Capistrano and the historic district, and would have negative impacts on the community, and historical resources.

This option would increase track capacity, reduce running times, improve safety, and increase reliability. However, it would have major constructability impacts, because of limited available right-of-way in the historic district, the close proximity of sensitive historic and cultural resources (including the historic downtown station), the need to maintain rail service during construction, and the need to demolish and replace the existing downtown parking structure and surface parking facilities (causing significant disruption to the downtown business community during construction). For these reasons, it was given a negative cost-effectiveness rating.

Historical resources could be directly impacted with this option, largely during construction. Property impacts would be very high in this option, as property for right-of-way would need to be acquired, and businesses would be impacted during construction, particularly as a result of the demolition of the parking structure (which would be rebuilt after the covered trench had been constructed). There would be noise and vibration impacts, both during construction and in areas of open trench after construction.

Figure 2.3.2-1
Option Eliminated from Further Consideration in San Juan Capistrano



The public acceptability of this option, as determined by comments and feedback from previous public meetings, is extremely negative. The City of San Juan Capistrano is on record as being opposed to this option, and asked that it be eliminated from further consideration. They believe the construction of this option would have long-term detrimental effects on the community. For reasons of cost, constructability, cost-effectiveness, potential impacts to historical resources and property, as well as public acceptability, this option was eliminated from further consideration.

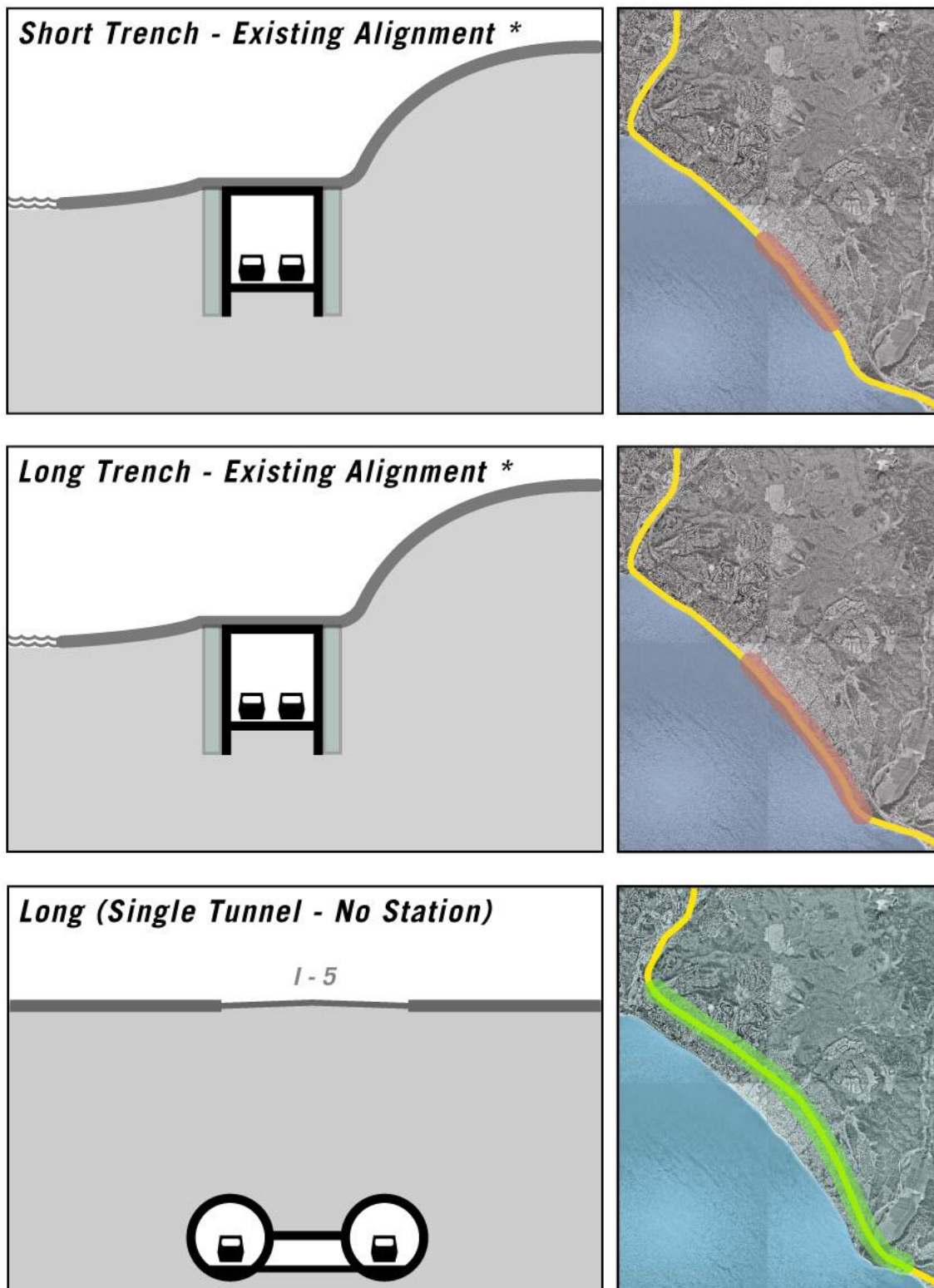
Dana Point and San Clemente

- **Short Trench:** This option provides for double-tracking while following the existing railroad right-of-way (see Figure 2.3.2-2). A short trench would be constructed through the San Clemente pier area to allow for safe pedestrian access across the tracks. Additional pedestrian under-crossings would also be constructed along the section of the corridor traveling at-grade on the beach.

The Short Trench option has severe construction impacts and high negative impacts to the environment and the community, yet offers only a marginal improvement to train service and performance.

Although the Short Trench option would increase track capacity (due to double tracking), it would provide no change in running times, no net improvements to safety, and no change to reliability. The Short Trench option offers significant constructability challenges, most notably the construction of the trench in the Pier Bowl and construction around Mariposa Point, while simultaneously maintaining access to the San Clemente Pier and existing rail service. The construction of the Short Trench option would also impact San Clemente businesses, which depend upon visitors to the beach. It was assessed as having a low cost-effectiveness rating (based upon the benefits it provides and the impacts it imposes, compared to its cost).

Figure 2.3.2-2
Options Eliminated from Further Consideration in Dana Point/San Clemente



The Short Trench option poses very significant constructability challenges, primarily because of the nature of the beach itself and the coastal bluffs (particularly at Mariposa Point – see Figure 2.3.2-3). Attempting to stabilize the beach and fragile coastal bluffs would require major construction efforts, including a seawall 10-20 feet (3-6 meters) high at the base of the bluffs, retaining walls within the trench itself, and tie-backs at the top of the bluffs, resulting in drastic changes to the existing environment. The use of heavy construction equipment in this sensitive beach and coastal bluff environment would also be problematic. Moreover, the constrained space available for construction of the trench and the need to maintain rail service during construction would create significant impacts.

The Short Trench option would have the highest environmental impacts. The covered portion of the trench would improve coastal access and reduce the barrier effect of the rail corridor in the Pier Bowl area. Other areas, where the trench was open or in transition would have greatly reduced access opportunities. Coastal access during construction would be greatly constrained in the Pier Bowl area. The Short Trench option reduces the barrier effect of the existing rail corridor through the downtown area by providing a covered trench. However, this option would do little to reduce or remove the impact of the rail corridor on adjacent residential uses. Additionally, the barrier effect between residential and recreational uses would increase as a result of the trench. The Short Trench option would impact beach aesthetics by imposing new concrete structures (the trench and its transitions) on the beach. The Short Trench option would not remove the rail line from the beach, but rather would submerge it into the beach, creating new, different impacts (including the need for the stabilization methods noted above). The beach and bluff impacts of the Short Trench concept would result in the highest impacts on natural resources and have major geological and soils constraints. Construction on the beach and bluffs would have high impacts to erodible soils, unstable slopes, and aesthetics and visual quality. Property impacts with the Short Trench option would include the likely need to acquire property during the construction period in order to stage equipment and materials. There was strong public sentiment for removing this alternative from further consideration.

Figure 2.3.2-3
Existing Rail Corridor at Mariposa Point



Long Trench: This option is similar to the Short Trench in that it would also remain largely within the existing railroad right-of-way, and would include curve straightening at Dana Point. The option would begin a bored tunnel through Mariposa Point, just south of the existing Metrolink station (at Avenida Pico and El Camino Real), then transition north of the pier into a cut-and-cover trench, which would continue until approximately 1,600 feet north of the San Diego County line (see Figure 2.3.2-2).

Although the Long Trench option offers significant improvements to train service and performance, it has severe construction impacts and high negative impacts to the environment and the community, as well as high construction costs.

Like the Short Trench option, the trench's double track would provide increased train capacity. Unlike the Short Trench, the Long Trench option would improve running times, safety, and reliability, due to the extensive grade-separated segment from Mariposa Point to the southern city limits. The construction of the Long Trench option would also impact San Clemente businesses, which depend upon visitors to the beach. While more costly than the Short Trench option (estimated \$150 million additional cost), the Long Trench is assessed to have a positive cost-effectiveness as a result of the benefits to train performance.

The Long Trench option would reduce the "barrier effect", due to the covered trench and tunnel section. However, there would be access issues during the construction phase, especially along the beach and in the Pier Bowl areas. Coastal impacts would result from the Long Trench option, as tunneling under the bluffs at Mariposa Point would be required. Property impacts would be significant, as acquisition of property would be required for the tunnel segment beneath the residential subdivision at Mariposa Point. Noise and vibration issues would be minimized as a result of the trench (and greatly reduced in the tunnel segment of the Long Trench).

The Long Trench option poses significant constructability challenges, most notably because of the nature of the beach itself and the coastal bluffs (particularly at Mariposa Point – see Figure 2.3.2-3). The use of heavy construction equipment in this sensitive beach and coastal bluff environment would also be problematic. Moreover, the constrained space available for construction of the trench and the need to maintain rail service during construction would create significant impacts.

The Long Trench option would have high environmental impacts. The covered portion of the trench would improve coastal access and reduce the barrier effect of the rail corridor in the Pier Bowl area. Other areas, where the trench was open or in transition, would have greatly reduced access opportunities. Coastal access during construction would be greatly constrained in the Pier Bowl area. The Long Trench alternative would impact beach aesthetics by imposing new concrete structures (the trench and its transitions) on the beach. The Long Trench option would not remove the rail line from the beach, but rather would submerge it into the beach, creating new, different impacts (including the need for the stabilization methods noted above). The beach impacts of the Long Trench concept would result in high impacts on natural resources and have major geological and soils constraints. Construction on the beach and bluffs would have high impacts to erodible soils, unstable slopes, and aesthetics and visual quality. Property impacts with the Long Trench option would include the likely need to acquire property through the residential community at Mariposa Point and during the construction period in order to

stage equipment and materials. There was strong public sentiment for removing this alternative from further consideration.

- **Long Single Tunnel (No Station):** This option is similar to the Interstate 5 Long Tunnel with station, except it would utilize a single (rather than split) tunnel, which does not allow for a station in San Clemente. Like the Long Tunnel with Station option, the new alignment bypasses both the sharp curve in Dana Point and the coastal environmental and pedestrian concerns in San Clemente. This option would leave the existing right-of-way in a trench approximately 500 feet south of Avenida Aeropuerto in San Juan Capistrano, entering into a tunnel just before coming under the right-of-way of Interstate 5. The option would continue beneath Interstate 5, leaving the right-of-way just north of Basilone Road, exiting the tunnel and returning to grade level at San Onofre Creek, then rejoining the existing railroad right-of-way (see Figure 2.3.2-2)

The Long Single Tunnel option would have many of the benefits and impacts as the Long Split Tunnel option. However, there are significant additional construction challenges incumbent in this option. A single tunnel more than 6 miles (9.6 km) in length is much more expensive and difficult to construct than the split tunnels proposed in the Long Tunnel (with station) option. The Long Single Tunnel option, that requires a single twin bore tunnel exceeding 11-miles (17.6 km), is expected to cost at least \$400 million more than the I-5 Long Split Tunnel option. Furthermore, this extremely long tunnel would require several large ventilation shafts to the surface and may require cross-overs to be constructed between the two twin bore tunnels.

Public acceptability for alignment options that would avoid the sensitive coastal areas has been positive; however this option would offer no opportunity for rail service in San Clemente. Therefore, it was eliminated from further consideration in the Program EIR/EIS.

South Orange County Inland Bypass Alternative

During the scoping process held in Spring 2002, continuing concerns about improvement alternatives within the existing LOSSAN alignment in the South Orange County Cities of San Juan Capistrano, Dana Point and San Clemente led to requests by the public to study an alternative that would bypass the highly sensitive segments of these communities. In Summer 2002, the Orange County Transportation Authority and the South Orange County Rail Working Group asked the Department to study an Inland Bypass Alternative that would locate any future rail improvement projects along an inland route that would bypass the South Orange County cities of San Juan Capistrano, Dana Point, and San Clemente.

Earlier in 2001, the California High-Speed Rail Authority had studied the possibility of locating a fully-grade separated, electrified high-speed rail line in the same vicinity, but due to significant community, environmental, cost and train performance issues, opted to eliminate this corridor from further consideration (refer to Section 2.2.1).

The Authority shared the results of its findings with the Department, as a means of helping the Department to determine whether further study of an Inland Bypass Alternative was desirable to provide additional alignment alternatives for further consideration in this Program EIR/EIS.

There are a number of issues related to an Inland Bypass Alternative. A summary of these issues, which led the Department to eliminate the Inland Bypass alternative from further evaluation, is provided below. More detail is provided in the LOSSAN Corridor Strategic Plan. Appendix B of the Strategic Plan provides additional documentation of the Authority's previous evaluation of the Bypass alternative.¹¹

Topography

Trains perform best where the grades (steepness) of the tracks over which they travel are not great. For passenger trains, a maximum grade of between 1 and 2 percent is standard (with a 1.2 percent grade the ideal maximum). While conventional diesel-powered trains can negotiate steeper grades of 2-3 percent over a short distance, they will slow significantly. Adding curves to the mix slows trains even further. The shared-use nature of the LOSSAN corridor requires that grades accommodate freight trains. Freight trains offer even more challenge and are unable to efficiently negotiate grades above 1.5 percent. Even if an alignment could avoid the steepest grades in the Bypass corridor (up to 4 percent), it is likely that several sustained grades of 2 percent or more would remain.

Traveling inland from the coast in southern Orange County, the topography becomes very problematic from a rail design standpoint. The hills and canyons would require significant tunneling in order to maintain the necessary and desirable grades and to limit the number of tight curves in the new corridor as the train passes through the many canyons and over the water courses in the area.

A preliminary estimate indicates the need for up to 20 miles (32 km) of tunnel along an Inland alignment, much of it continuous. Tunnels greater than 6 miles (9.6 km) in length offer significantly greater complexity including the need for extensive ventilation shafts and the difficulties of operating non-electric, diesel-powered equipment in such a long tunnel. Tunnels of over 10 miles (16 km) raise fundamental questions of constructability given California's seismic and soil conditions. The study area for the Inland Bypass includes sections wherein the soil types are subject to liquefaction or earthquake-induced slides, complicating design and construction.

Environmental and Land Use Concerns

The Inland Bypass Alternative study area includes the last large remaining parcels of undeveloped land in Orange County outside the land preserved as part of the Cleveland National Forest, largely comprised of the 25,000-acre Rancho Mission Viejo. Several concerns have been raised about development of any kind in this area, including the completion of the SR-241 Foothill-South Toll Road.

Environmental concerns include:

- Impacts to Wetland and Water Resources - Water and wetlands resources within the Inland Bypass Alternative study area are extensive, with 24 known wetland and

¹¹ Appendix B of the Strategic Plan is a technical memo highlighting the Authority's findings from its July, 2001 *High-Speed Train Alignments/Stations Screening Evaluation* report, which evaluated several alignment alternatives in south Orange County, among them two alternatives that would bypass sensitive beachside and historic areas in San Juan Capistrano, Dana Point and San Clemente.

riparian areas. Between Irvine and the San Diego county line, the Inland Bypass rail corridor would involve crossing three rivers and 12 creeks.

- Floodplain Impacts - The study area includes numerous 100-year floodplain zones, and is associated with unnamed drainages, tributaries and small creeks. In South Orange County these floodplains vary in width from 100 to 5,000 feet (30 to 1500 m).
- Possible impacts to Threatened and Endangered Species, their Habitat and Wildlife Refuges - Twenty-one threatened and endangered species are known to exist within the study area, ranging from "Species of Special Concern" to those federally listed as "Threatened".
- Farmland Impacts - From the current terminus of SR-241 at Oso Parkway south to SR-74 (Ortega Highway), there are scattered parcels of farmland identified by the California Department of Conservation as either "Prime and Unique" or "Farmland of Statewide Significance".
- Parks and Recreational Resources – In addition to the General Thomas F. Riley Wilderness Park and Rancho Mission Viejo Ecological Reserve, the study area includes O'Neill Regional Park and San Onofre State Beach.
- Potential impacts to adjacent land uses could include (1) impacts to residential home values, or economic losses to the local business community, and new costs to cities along the rail corridor as a result of construction and rail operations, (2) introduction of new visual impacts, (3) property Impacts, including the need to acquire properties and businesses for right-of-way or to secure easements, (4) noise and vibration impacts to directly adjacent residences and businesses, and (5) introduction of new pedestrian access and traffic circulation barriers.

Federal and state resource agencies, including the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, and California State Parks Service, have previously expressed concerns over the introduction of a new inland bypass rail corridor in South Orange County, citing reasons and factors such as those highlighted above.

Transitions to/from the Existing LOSSAN Corridor

An important consideration in the creation of a new Inland Bypass Alternative alignment is how the new corridor would diverge from and return to the existing LOSSAN rail corridor. It is likely that such a transition would take place in the north near the Irvine Transportation Center (ITC). Three options for this transition exist (detailed in the LOSSAN Corridor Strategic Plan). Any of these options would require extensive disruption of existing and planned land uses, call for significant land and right-of-way acquisition, and generate significant controversy from residents and cities along the proposed alignment.

In the south, the most likely transition would be near the border of Orange and San Diego counties, just north of the San Onofre Nuclear Generating Station and near Basilone Road. The land east of the I-5 freeway is part of San Onofre State Beach. The transition would require either a "flyover" crossing of I-5, or a short tunnel beneath the freeway. Such a crossing would require coordination with and approval by the California

State Parks Department and the establishment of a use easement to permit rail to operate within the park.

Costs of the New Corridor

Costs for an Inland Bypass Alternative rail corridor cannot be accurately predicted without a specific alignment and profile. However, given the costs of land acquisition, construction (including tunneling) and costs of tracks, signaling and station construction, it is likely that the costs would be in the billions of dollars.

In the Authority's previous analysis of possible Inland Bypass Alternative routes, which would call for 62 miles (99 km) of new double track, much of it on structure, the Authority determined the costs associated with an Inland corridor would be approximately \$1 billion more than the most expensive conventional rail improvements being evaluated for the LOSSAN corridor in the same area. This conclusion was for an electrified, passenger-only system capable of negotiating sustained grades of up to 3.5 percent. The cost would increase significantly from that estimate with a profile limited to 1.5% grades to accommodate conventional passenger trains or freight along the same alignment.

Train Service and Performance Benefits/Impacts

The creation of a new, double-track rail corridor on an Inland Bypass Alternative corridor would provide increased track capacity, and could provide access to a new rail market along its route. Safety and reliability of service along an Inland route would likely be higher than that in the existing LOSSAN corridor. However, it would be substantially longer, far more expensive to build, and the grades and curves along a potential alignment (with or without tunneling) would likely increase running times.

There is also a significant question as to how Amtrak (provider of the Pacific Surfliner intercity rail service) and the Southern California Regional Rail Authority (operator of the Metrolink commuter rail service) would be affected. As stated in Chapter 1, the LOSSAN corridor is currently the second-busiest intercity rail corridor in the nation. It is unknown whether rail providers would seek to continue to serve the existing LOSSAN corridor, or opt instead to serve the Inland corridor only. Whether or not existing and future markets along both corridors would justify a high level of service to both is also unknown, but it is likely that ridership on both Amtrak and Metrolink services would suffer as a result of the relocation of the rail corridor.

Additionally, it is unknown whether the combined rail owners and operators would be able (or willing) to assume maintenance of the two corridors. In early May 2003 the Department sent a request for information to Amtrak and Metrolink, seeking their input and best assessment as to what the creation of an Inland Bypass Alternative alignment would do to their service planning and operational considerations. Their responses (see Appendix 2.3-A) raised questions about organizational responsibility for acquisition, development and maintenance of the new right-of-way, as well as a concern about operational benefits in terms of scheduling and ridership as a result of a new inland route. If service moves exclusively to the new corridor, the lower population densities of the Inland communities and the decrease in ridership (as passengers who previously traveled by rail chose other modes) could result in reduced operating revenues despite the higher costs involved in the construction of an Inland Bypass Alternative corridor.

Implications for the Existing LOSSAN Corridor

Given the grades found within the Inland Bypass Alternative study area, it is highly likely that freight service would need to remain on the existing LOSSAN corridor, and that the inland bypass corridor would be exclusively for the use of passenger (intercity and commuter) rail services. This would result in a situation where two rail corridors existed in South Orange County, with environmental and community issues along each, and no opportunity for removal of the existing rail corridor along the coastline in Dana Point and San Clemente.

Elimination or relocation of stations as a result of the Inland corridor would reduce accessibility to rail service for residents of Irvine, Lake Forest, Laguna Hills, Laguna Woods, Laguna Beach, Mission Viejo, San Juan Capistrano, Dana Point, and San Clemente.

Summary of Reasons for Elimination of the Inland Bypass Alternative

An Inland Bypass would not be a practicable alternative, due to the following factors:

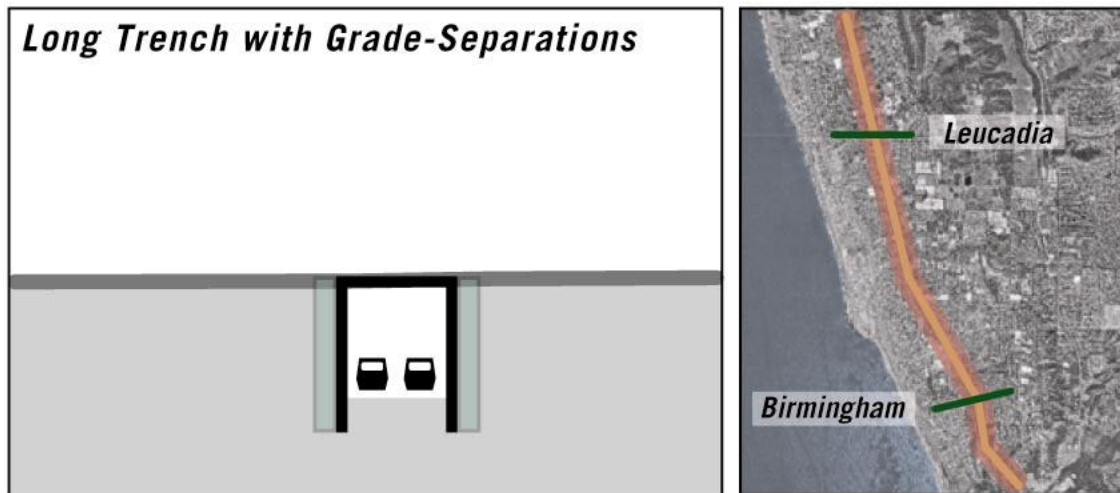
- It represents a long and slow alternative
- It would be the most expensive alternative studied, significantly more than any of the proposed improvements along the existing LOSSAN corridor
- It raises considerable environmental issues
- It features grades steep enough to require extensive tunneling, all but eliminating the possibility of the new route's use as a freight corridor.
- Retention of the existing alignment to accommodate freight would result a situation in which environmental and community issues are present on two corridors, rather than the opportunity to improve conditions along the existing corridor, with no benefits either to South Orange County cities, the environment, or to rail operators.

Much of the impetus behind the Inland Bypass Alternative was a continuing concern over the further study of LOSSAN improvements through downtown San Juan Capistrano and the coastal alignment through San Clemente. As discussed in the previous sections, those alternatives have now been eliminated. Based on the evaluation done during the LOSSAN Strategic Plan process, the Inland Bypass option was also eliminated from further study in this Program EIR/EIS.

Encinitas

- Long Trench: This option would consist of a double-track open trench that would extend the length of the City of Encinitas (see Figure 2.3.2-4). The trench would be covered through the downtown area, and new pedestrian crossings would be provided at other locations. The Long Trench option would run through the extent of Encinitas (approximately 7 miles (11 km)), rather than just the downtown area.

Figure 2.3.2-4
Options Eliminated from Further Consideration in Encinitas



The Long Trench option would provide train performance and community benefits. This option would have high costs and construction impacts/issues associated with the construction of a 7-mile (11 km) trench. The Long Trench is expected to cost at least \$250 million more than other options evaluated in Encinitas. Moreover, the existing at-grade crossings at Leucadia Blvd and Birmingham Drive would remain until the Long Trench was fully-funded and constructed.

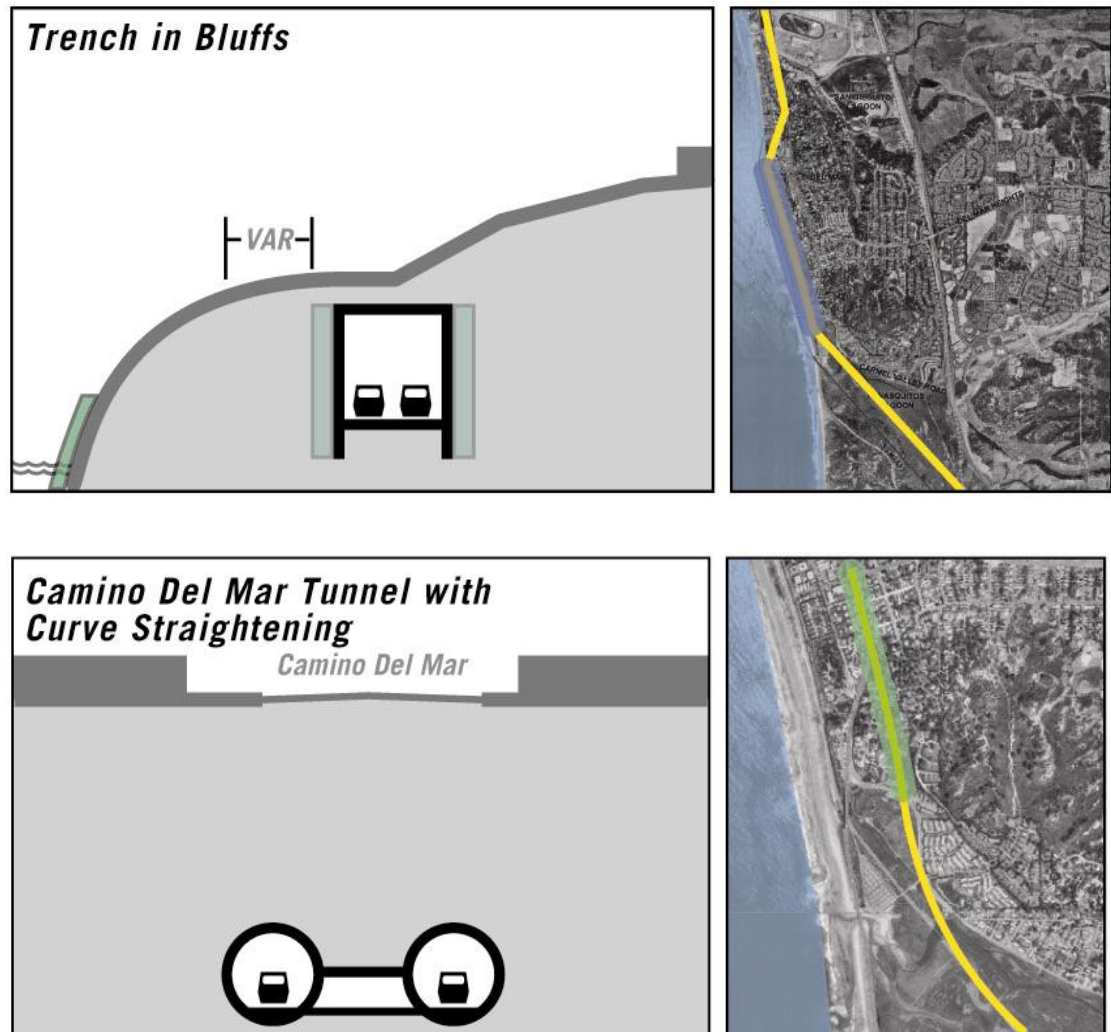
The Long Trench's cost-effectiveness is rated negatively because of the significant construction issues and high cost associated with construction. Although there has been considerable public support for this concept in the past, its high cost and constructability issues makes this option impracticable.

Del Mar

- **Trench-in-Bluffs:** The Trench-in-Bluffs (Trench) option would follow the existing rail alignment, but would provide two mainline tracks in a partially covered concrete trench along the Del Mar Bluffs (see Figure 2.3.2-5)). In order to do so, significant bluff stabilization efforts would be required, including tie-backs at the top of the Bluffs, a seawall at the base of the bluffs, and retaining walls within the trench itself.

The Trench option offers very significant constructability challenges, most notably because of the nature of bluffs themselves (see Figure 2.3.2-6). Attempting to stabilize the fragile coastal bluffs would require major construction efforts, including a seawall 10 to 20 feet (3 to 6 meters) high at the base of the bluffs, retaining walls within the trench itself, and tie-backs at the top of the bluffs, resulting in drastic changes to the existing environment. The use of heavy construction equipment in this sensitive environment would also be problematic. Moreover, the constrained space available for construction of the trench and the need to maintain rail service during construction would create significant impacts.

Figure 2.3.2-5
Options Eliminated from Further Consideration in Del Mar



The Trench option would have the highest environmental impacts of the alternatives evaluated in Del Mar. In areas where the trench would be covered, community impacts and barrier issues would be reduced, however, in other areas where the trench was either open or the alignment was at-grade, these impacts would be exacerbated because of the double-track width of the trench. The Trench option would not remove the rail line from the bluffs, but rather would submerge it into the bluffs, creating new, different impacts (including the need for the stabilization methods noted above). The stabilization of the bluffs would result in the highest impacts on natural resources, and the bluffs have major geological and soils constraints. Construction on the bluffs would have high impacts to erodible soils, unstable slopes, and aesthetics and visual quality. Property impacts with the Trench option would include the likely need to acquire property during the construction period in order to stage equipment and materials.

**Figure 2.3.2-6
Train Passing Along Del Mar Bluffs**



Public and agency input has been nearly unanimous in favor of removing the track from the fragile bluffs. The concept of major stabilization and trench-and-cover construction along this highly environmentally sensitive area would be strongly opposed by both the community and the state and federal resource agencies.

- **Camino Del Mar Tunnel #2:** The Camino Del Mar Tunnel would relocate the rail line on Del Mar's sensitive bluffs into a tunnel which would run under Camino Del Mar. The Camino Del Mar Tunnel #2 Option includes curve straightening that would take the tunnel beneath a residential area at the southern end of Del Mar and the northern edge of San Diego.

This design option would be more costly and create more community and potential environmental impacts than other alternatives while providing only minimal travel time benefits due to the curve straightening.

As a result of the curve straightening at the south end of Del Mar, there would be some significant property impacts (acquisitions and easements) in the tunnel transition areas, and where the tunnel passed beneath residential property. In addition, the curve straightening would cross Penasquitos Lagoon at a new location, causing additional impacts and disruption to this environmentally sensitive area.

Community acceptability for the Camino Del Mar Tunnel #2 option is generally negative. It was eliminated due to its community and environmental impacts as well as its higher cost.

2.4 NO PROJECT/NO ACTION ALTERNATIVE

The No Project/No Action Alternative (No Project) is the baseline for comparison of the Rail Improvements Alternative. The No Project Alternative represents the LOSSAN region's transportation system (highway and conventional rail) as it would be after implementation of programs or projects that are currently programmed in Regional Transportation Plans (RTPs) and that are funded for implementation and expected to be in place by 2020. This financially constrained level of infrastructure improvement (which includes federal, state, regional, and local funding) is analyzed together with the significant growth in population and transportation demand that is projected to occur by 2020. Figure 2.4-1 provides a listing of all rail projects expected to be in place by 2020.

The No Project Alternative addresses the geographic area that is served by the LOSSAN corridor intercity passenger rail service defined in Chapter 1 -- Los Angeles, Orange and San Diego Counties (LOSSAN region). Figure 2.4.1-1 illustrates the existing intercity transportation infrastructure that currently serves these major travel markets.

The No Project Alternative satisfies the statutory requirements under CEQA and NEPA for an alternative that does not include any new action or project beyond what is already committed. The No Project Alternative defines the existing and future intercity transportation system in the LOSSAN region based on programmed and funded improvements through 2020, according to the following sources of information.

- State Transportation Improvement Program (STIP)
- RTPs, financially constrained projects for all modes of travel
- Intercity passenger rail plans

The future improvements that would be part of the No Project Alternative are also included under the Rail Improvements Alternative (Section 2.4) as part of the future 2020 baseline. Figure 2.4.0 No Project includes highway and conventional rail elements, as discussed below.

2.4.1 Highway Element

The No Project highway system that currently serves the intercity travel market for the LOSSAN region consists primarily of Interstate 5. The No Project Alternative includes this existing highway between Los Angeles and San Diego, as well as funded and programmed improvements to I-5 based on financially constrained RTPs developed by regional transportation planning agencies. I-5 improvements included as part of the No Project Alternative include infrastructure projects as well as intelligent transportation system (ITS) and other potential system improvements programmed to be in operation by 2020. The highway improvements included as part of the No Project Alternative are listed by county in Table 2.4.1-1.¹²

¹² A number of highways exist in the general region between Los Angeles and San Diego; however, I-5 and I-8 are the primary intercity highways within the area previously defined in this document as the LOSSAN region. In the broader region, intercity highways in addition to I-5 and I-8 are evaluated in the California High-Speed Rail Authority's statewide HST Program EIR/EIS (2003) as part of its No Project, Modal, and HST Alternatives.

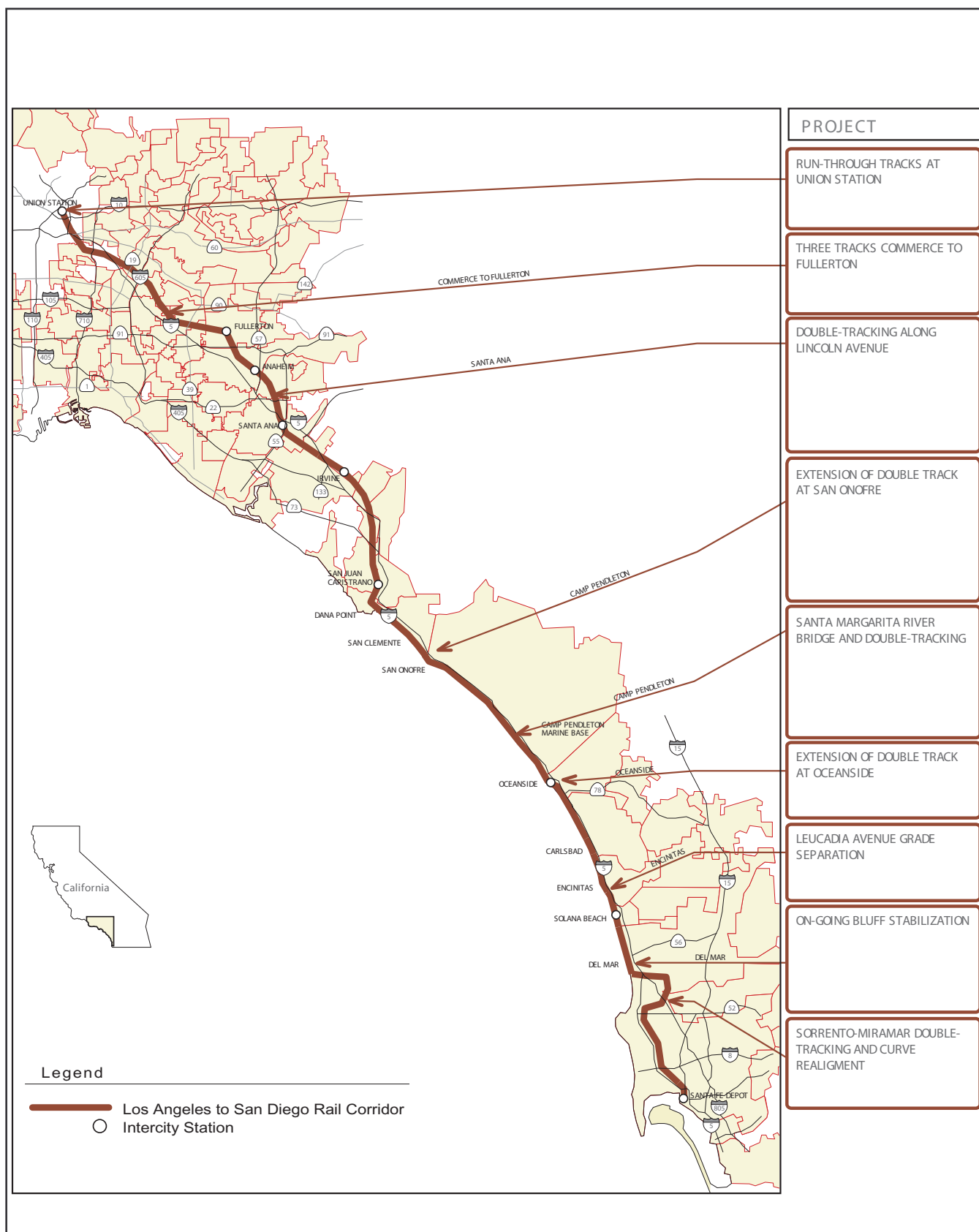


FIGURE 2.4-1

**LOSSAN Corridor Rail Improvement Projects
Included in the No-Project Alternative**
LOSSAN Rail Corridor Improvements
Program Environmental Impact Report / Environmental Impact Statement



U.S. Department
of Transportation
**Federal
Railroad
Administration**



FIGURE 2.4.1-1

Existing Intercity Transportation Infrastructure in LOSSAN Corridor

LOSSAN Rail Corridor Improvements

Program Environmental Impact Report / Environmental Impact Statement



U.S. Department
of Transportation
Federal
Railroad
Administration

Table 2.4.1-1
Programmed Intercity Highway Improvements Included In The No-Build Alternative

County	Type of Project	Description
Los Angeles	HOV	HOV Project on SR-14 (Ave P-8 to Ave-L)
Los Angeles	HOV	HOV Project on I-710 (I-10 to I-210)
Los Angeles	HOV	HOV Project on I-5 (SR-19 to I-710)
Los Angeles	Highway Widening	I-710 (I-10 to I-210) Additional Mixed Flow Lane
Los Angeles	Highway Widening	I-5 (Rosecrans to Orange Co) Additional Mixed Flow Lane
Los Angeles	Highway Widening	I-405 (US-101 to I-105) Additional Mixed Flow Lane
Los Angeles	Highway Widening	SR-57 (SR-60 to Orange Co) Additional Mixed Flow Lane
Orange	HOV	HOV Project on I-5 (SR-1 to Avenida Pico)
Orange	Highway Widening	I-5 (SR-91 to Los Angeles Co) Additional Mixed Flow Lane
Orange	Highway Widening	SR-91 (westbound auxiliary lane SR-57 to I-5) Additional Mixed Flow Lane
Orange	Highway Widening	SR-91 (auxiliary lanes SR-241 to SR-71) Additional Mixed Flow Lane
Orange	Highway Widening	SR-57 (auxiliary lanes Los Angeles Co to SR-91) Additional Mixed Flow Lane
San Diego	Highway Interchange/ Widening	I-5 at I-805 – New interchange with 10 freeway and 2 HOV lanes.
San Diego	Highway Widening	I-5 from Mission Bay Drive to SR-52 – Addition of a northbound auxiliary lane.
San Diego	Highway Widening	I-5 at SR-78 Interchange: NB-EB Connector – Widen auxiliary lane and ramp.
San Diego	Highway Widening	I-15 from SR-163 to SR 78 – Addition of auxiliary lanes and meters. Bridge widening
San Diego	Highway Widening	I-15 from SR-56 to Centre City Parkway – Addition of 4 HOV/Managed lanes
San Diego	Highway Widening/ HOV	I-5 from Del Mar Heights Road to Birmingham Drive – Upgrade from existing 8-lane freeway to 12-lane freeway and 2 HOV lanes.
San Diego	Highway Interchange	I-15/SR-56 Interchange Ramp (EB-NB) – Loop ramp.
San Diego	Highway Widening/ HOV	I-5 from Del Mar Heights Road to Encinitas Boulevard – Upgrade from 8-lane freeway to 12-lane freeway and 2 HOV lanes.
San Diego	Highway	I-5 from Encinitas Boulevard to La Costa Boulevard – Upgrade from 8-lane freeway to 10-lane freeway and 2 HOV lanes.
San Diego	Highway	I-15 from SR-163 to SR-56 – Addition of 4 HOV/Managed lanes.
San Diego	TSM	ITS: Enhanced Incident/Emergency Response, Traveler/Commercial Vehicle Operations Information, and Management System Software.

2.4.2 Conventional Passenger Rail Element

The existing intercity passenger rail service provided on the LOSSAN corridor is known as the Pacific Surfliner. This passenger service shares track with freight and commuter services. All the intercity passenger rail system improvements identified in the STIP and the Department's California Intercity Rail Capital Program for implementation in the LOSSAN corridor prior to 2020 are included in the No Project Alternative and are identified in Table 2.4.2.1.

Table 2.4.2-1
Programmed Conventional Rail Improvements Included In The No-Build Alternative

County	Type of Project	Description
Los Angeles	Conventional Rail	Run through tracks at L.A. Union Station. (This project is not yet fully funded. However, it is currently the subject of a project-specific Environmental Impact Report/Statement, and is assumed to be built by 2020.)
Los Angeles	Conventional Rail	Continuous third main track from Union Station to Fullerton
Orange	Conventional Rail	Double tracking along Lincoln Avenue in Santa Ana
San Diego	Conventional Rail	Extension of Double-Track in Oceanside
San Diego	Conventional Rail	Sorrento-Miramar Double-Tracking and Curve Realignment
San Diego	Conventional Rail	Santa Margarita River Bridge Replacement and Double-Tracking
San Diego	Conventional Rail	Del Mar Bluffs Stabilization (Ongoing)

2.5 RAIL IMPROVEMENTS ALTERNATIVE

The Rail Improvements Alternative represents the proposed action and encompasses a number of alignment options for meeting the purpose and need for incremental improvements to the LOSSAN corridor, as outlined in Chapter 1.

A number of conventional rail improvement alternatives were evaluated against the following Department objectives for the LOSSAN corridor:

- Increase the cost-effectiveness of State-supported intercity passenger rail systems by improving running times and reliability to attract additional ridership
- Increase capacity on existing routes, through more-efficient, reliable operations
- Reduce running times to attract additional riders and to provide a more attractive service, and
- Improve the safety of State-supported intercity rail service through additional grade crossing improvements and grade separations.

The rail improvements were also developed and refined to address existing environmental impacts and minimize new ones, as well as community impacts that exist along the present-day LOSSAN corridor.

The conventional Rail Improvements Alternative evaluated by the Department and carried forward for evaluation in this Program EIR/EIS are summarized in Table 2.5-1. The alternative is described in detail and illustrated in the following sections.

Table 2.5-1
Conventional Rail Improvements Alternative Evaluated for the LOSSAN Corridor

Alignment Segments and Station Locations Evaluated
Union Station To Fullerton Station AT-GRADE 4 th Main Track
Fullerton Station To Irvine Station--Double Tracking
AT-GRADE with grade separations at major intersections
TRENCH
Stations Fullerton
Anaheim
Santa Ana
Irvine
San Juan Capistrano Double Tracking
TUNNEL along Interstate 5
AT-GRADE and Cut/Cover TRENCH along Trabuco Creek
Stations San Juan Capistrano
Dana Point/San Clemente Double Tracking
Dana Point Curve Realignment; San Clemente - SHORT TUNNEL
San Clemente - LONG TWO-SEGMENT TUNNEL;
Stations San Clemente
Camp Pendleton AT-GRADE double tracking
Oceanside/Carlsbad Double Tracking
Carlsbad - AT-GRADE; double tracking
Carlsbad -TRENCH; double-tracking
Stations Oceanside
Encinitas/Solana Beach Double Tracking
Encinitas - AT-GRADE double tracking with grade-separations at major intersections
Encinitas - SHORT TRENCH; Double Tracking
Encinitas - LONG TRENCH; Double Tracking
Stations Solana Beach

Alignment Segments and Station Locations Evaluated	
Del Mar Double Tracking	
AT-GRADE double tracking on existing alignment	
COVERED TRENCH on bluffs in Del Mar	
TUNNEL #1 under Camino Del Mar	
TUNNEL under I-5	
I-5/805 Split To Hwy 52 Double Tracking	
Miramar Hill Tunnel	
I-5 Tunnel	
Stations UTC (Only applies to Miramar Hill Tunnel)	
Hwy 52 To Santa Fe Depot Curve realignment and Double Tracking at-grade and short trench	
Stations Santa Fe Depot	

Table 2.5-2 (below) provides a listing of all existing LOSSAN corridor at-grade crossings, and how they would be treated (remain at-grade or be grade separated) as part of either the No-Project or Rail Improvements Alternatives.

**Table 2.5-2
List of Existing Grade Crossings and Proposed Grade Separations**

Location (City) – North to South	Existing Condition	No-Project Alternative	Rail Improvements Alternative	
			Low-Build Scenario	High-Build Scenario
Los Angeles				
Serapis	At-Grade			New U/C
Passons	At-Grade			New U/C
Norwalk				
Pioneer Blvd.	At-Grade			New U/C
Norwalk Blvd.	At-Grade			New U/C
Los Nietos	At-Grade			New U/C
Marquardt, Rosecrans	At-Grade			New U/C
Valleyview	At-Grade			New U/C
San Pedro Branch Crossing	At-Grade			Hobart Flyover
UPRR Crossing	At-Grade			Rail Flyover-Crossing Track
Anaheim				
Orangethorpe	At-Grade			New U/C
La Palma	At-Grade			New U/C
Sycamore	At-Grade			New U/C
Broadway	At-Grade			New U/C
Santa Ana	At-Grade			New U/C
South	At-Grade			New U/C
Vermont	At-Grade			New U/C
Ball	At-Grade		New U/C	New U/C
Cerritos	At-Grade			New U/C
State College	At-Grade		New U/C	New U/C

Location (City) – North to South	Existing Condition	No-Project Alternative	Rail Improvements Alternative	
			Low-Build Scenario	High-Build Scenario
Orange				
Eckhoff	At-Grade			Close crossing
Main	At-Grade			Trench
Batavia	At-Grade			Trench
Walnut	At-Grade			Trench
Palm	At-Grade			Trench
Chapman	At-Grade			O/C-Trench
Almond	At-Grade			O/C-Trench
Palmyra	At-Grade			O/C-Trench
La Vera	At-Grade			O/C-Trench
Santa Ana				
Fairhaven	At-Grade			O/C-Trench
Santa Clara	At-Grade			O/C-Trench
Seventeenth	At-Grade			New Bridge
Santa Ana Blvd.	At-Grade			New Bridge
Fourth	At-Grade			New Bridge
Grand	At-Grade			New Bridge
Lyon	At-Grade			New U/C
McFadden	At-Grade			New U/C
Ritchey	At-Grade			New U/C
Tustin				
Red Hill	At-Grade			New U/C
Irvine				
Harvard	At-Grade			New U/C
Jeffrey		G/S by others		
Sand Canyon		G/S by others		
San Juan Capistrano				
Rancho Capistrano (Private)	At-Grade		Widen	New U/C
Oso	At-Grade		Widen	None (Bypass to I-5)
La Zanja	At-Grade		None (Tunnel)	None (Bypass to I-5)
Verdugo	At-Grade		None (Tunnel)	None (Bypass to I-5)
Del Obispo	At-Grade		None (Tunnel)	None (Bypass to I-5)
Avenida Aeropuerto	At-Grade			New U/C
Cassidy Brothers (private)	At-Grade			New U/C
Dana Point				
Beach Road	At-Grade		New U/C	None (Location bypassed)
Senda De La Playa	At-Grade			None (Location bypassed)
Califia – Pedestrian Crossing	At-Grade			None (Location bypassed)
Camp Pendleton				
Coaster Way	At-Grade			New U/C
Oceanside				
Surfrider Way	At-Grade			New U/C
Mission	At-Grade			New U/C
Wisconsin	At-Grade			New U/C
Oceanside	At-Grade		Widen	New U/C

Location (City) – North to South	Existing Condition	No-Project Alternative	Rail Improvements Alternative	
			Low-Build Scenario	High-Build Scenario
Cassidy	At-Grade		Widen	New U/C
Carlsbad				
Grand	At-Grade		Widen	O/C – Trench
Carlsbad Village	At-Grade		Widen	O/C – Trench
Tamarack	At-Grade			O/C – Trench
Private Road	At-Grade		Widen	Close crossing
Cannon	At-Grade			O/C – Trench
Encinitas				
Leucadia Blvd.	At-Grade	New U/C		
Encinitas Blvd.	At-Grade		Widen	O/C – Trench
D Street	At-Grade		Widen	O/C – Trench
E Street	At-Grade		Widen	O/C – Trench
Chesterfield	At-Grade		New U/C	O/C – Trench
Del Mar				
Coast Blvd./Ocean Avenue	At-Grade		At-Grade/Ocean – New O/C	None (Tunnel)
Roselle Street	Not on Existing Corridor			New U/C
San Diego				
Edelweiss	At-Grade			
La Jolla Colony	Next to (but not crossing LOSSAN)			New U/C
Private Crossing	At-Grade			New U/C
San Diego (continued)				
Rosecrans/Taylor	At-Grade			New U/C
Noell	At-Grade			New U/C
Washington	At-Grade			New U/C
Vine	At-Grade			New U/C
Sassafrass	At-Grade			New U/C
Palm	At-Grade			New O/C (over Trench transition)
Laurel	At-Grade			New O/C (Trench)
Juniper	At-Grade			New O/C (Trench)
Hawthorne	At-Grade			New O/C (Trench)
Grape	At-Grade			New O/C (Trench)
Cedar	At-Grade			New O/C (over Trench transition)
Beech	At-Grade			New O/C (over Trench transition)
Ash	At-Grade			At-Grade (entering Station area)
LEGEND:				
O/C – Overcrossing				
U/C – Undercrossing				

2.5.1 LOSSAN Rail Improvements Alternative Carried Forward

As a result of the screening process presented in the LOSSAN Corridor Strategic Plan, the conventional rail improvements described below are evaluated in this Program EIR/EIS as the Rail Improvements Alternative, which would result in a fully double-tracked (with four tracks between LA Union Station and Fullerton) rail corridor from Los Angeles, through Orange County, to San Diego. The Alternative's individual improvements and its design options are described in three sections below:

- LA Union Station to Irvine
- Irvine to Oceanside
- Oceanside to San Diego Santa Fe Depot

A. LA UNION STATION TO IRVINE

Commerce to Fullerton

Proposed corridor improvements in this section include construction of a fourth main track in the existing rail corridor between Commerce and Fullerton (see Figure 2.5.1-1). At build-out, two tracks would be dedicated to passenger rail and two to freight. Improvements can probably be accommodated within existing LOSSAN right-of-way (ROW) except between Rio Hondo River and San Gabriel River.

Fullerton to Irvine

This section would be double-tracked between Walnut Avenue in Orange and East 17th Street in Santa Ana. An existing curve would be straightened between Batavia Street and Walnut Avenue. These improvements would be accommodated within the existing LOSSAN ROW except for a portion of the curve realignment. Two options are being evaluated:

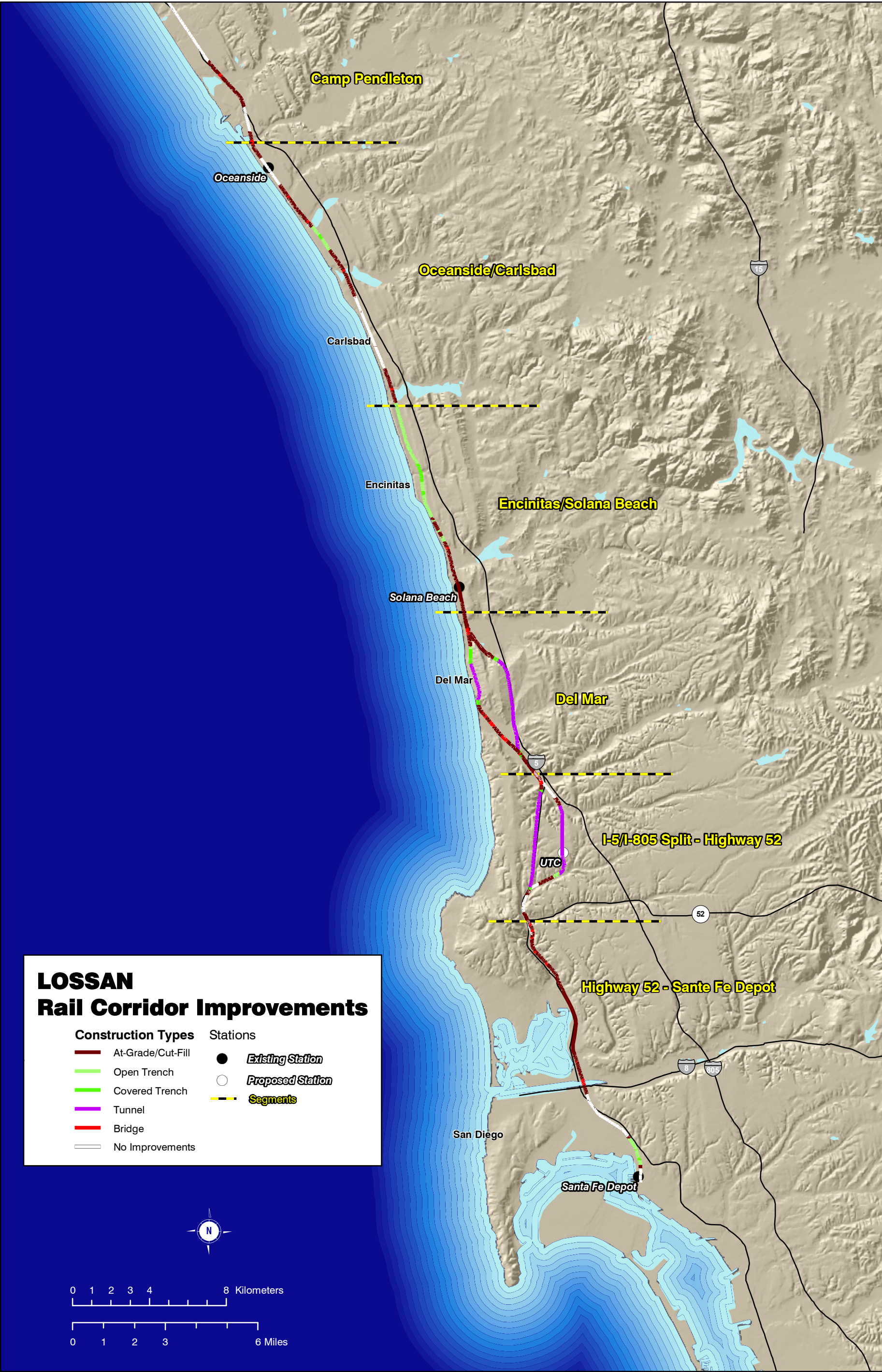
- At-grade Option – Double-track at-grade, including the curve realignment; the only grade separations would be at street intersections
- Covered Trench Option – Double-track and fully grade-separate this section, including the curve realignment, by placing the rail corridor in a covered trench along its existing alignment.
- Stations
- Fullerton Station: Bypass tracks and additional parking would be added at this existing station, and the existing platform would be reconfigured.
- Anaheim, Santa Ana, and Irvine Stations: Improvements to these existing stations would include bypass tracks and additional parking.



LOSSAN Rail Corridor Improvements

Program Environmental Impact Report / Environmental Impact Statement





Source : IBI, 2003



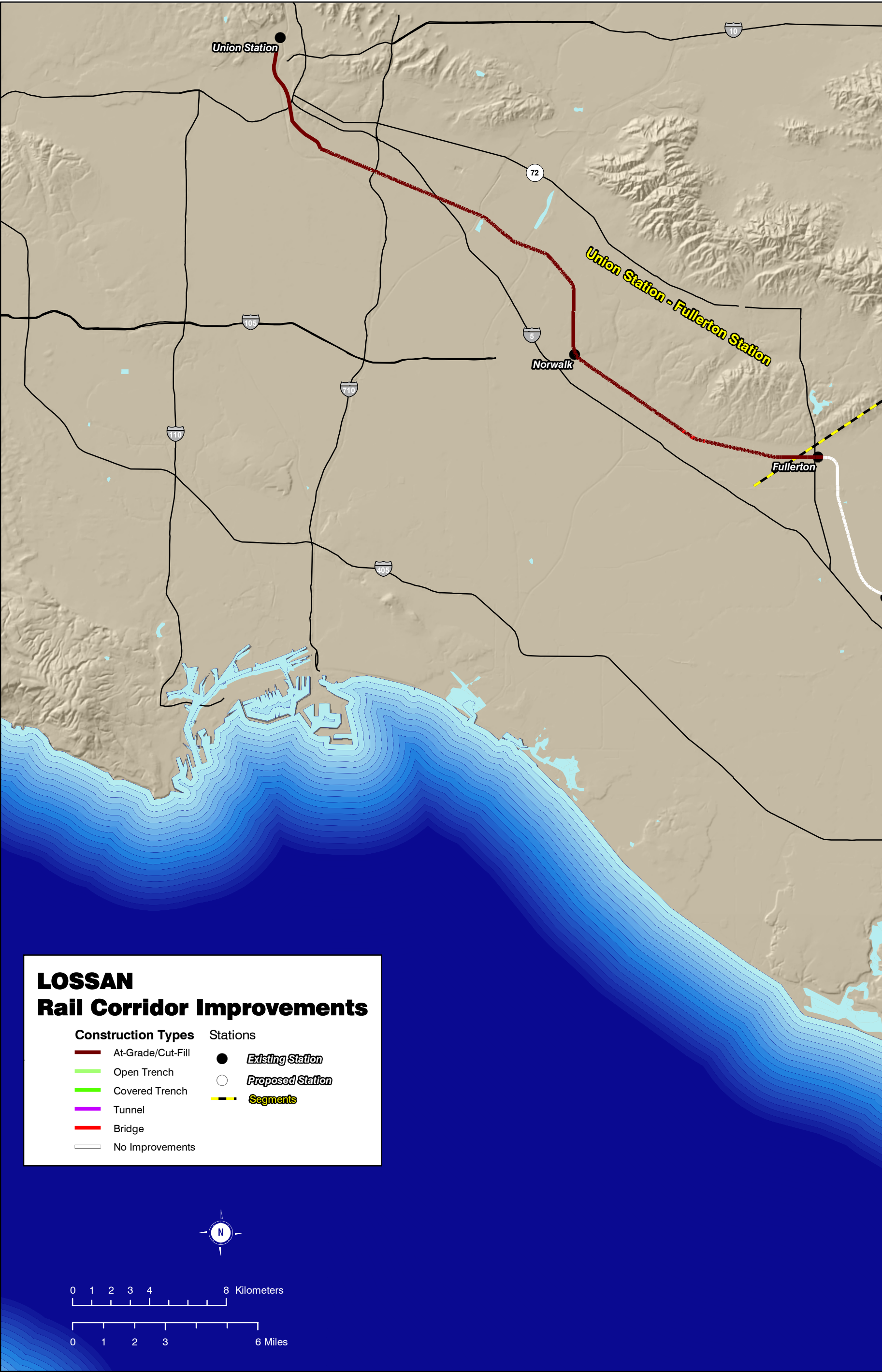
FIGURE 2.5-3
LOSSAN Rail Corridor Improvements Alternative
LOSSAN Rail Corridor Improvements
Program Environmental Impact Report / Environmental Impact Statement



Source: IBI group



FIGURE 2.5-2
LOSSAN Rail Corridor Improvements Alternative
LOSSAN Rail Corridor Improvements
Program Environmental Impact Report / Environmental Impact Statement



Source : IBI Group



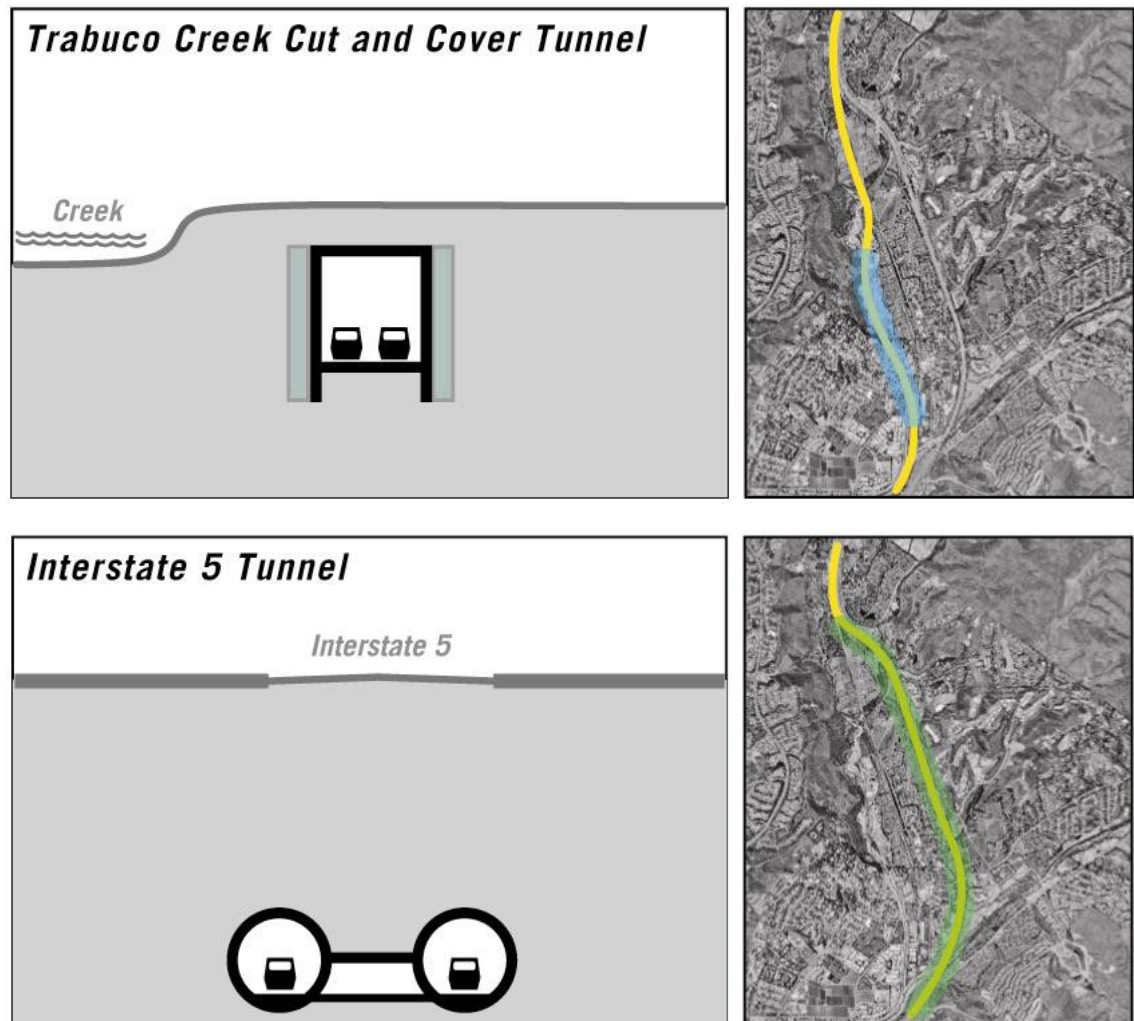
FIGURE 2.5-1
LOSSAN Rail Corridor Improvements Alternative
LOSSAN Rail Corridor Improvements
Program Environmental Impact Report / Environmental Impact Statement

B. IRVINE TO OCEANSIDE**San Juan Capistrano**

Double tracking is being evaluated through the City of San Juan Capistrano in one of two alternative alignments (see Figure 2.5.1-2):

- **Interstate 5 Tunnel** - Relocate the rail corridor into a tunnel under I-5 that would run the length of the city, from Highway 73 to Avenida Aeropuerto. The tunnel would run under Trabuco Creek and San Juan Creek, and would avoid the downtown area where the existing LOSSAN corridor is located. Transition areas at either end of the tunnel would require some property or easement acquisition. Although this option would not allow for a station in San Juan Capistrano, it was retained for further evaluation as the only practicable below-grade (tunnel) option to avoid the impacts to downtown.

Figure 2.5.1-2
Options to be Retained for Further Study in San Juan Capistrano



- **At-Grade and Open Trench along Trabuco Creek** – This alignment option runs along the east side of Trabuco Creek. It would leave the existing LOSSAN corridor south of Del Obispo and continue at-grade along the creek, then transition into an open trench. The alignment would transition back to at-grade north of Ramos Street and rejoin the existing LOSSAN corridor at the Trabuco Creek crossing. The existing bridge structure over the creek would be rebuilt to accommodate the alignment. A new station would be constructed along this alignment. This option was proposed by the City of San Juan Capistrano as an alternative to the Interstate 5 tunnel option which would preclude a station in the city.

Dana Point/San Clemente

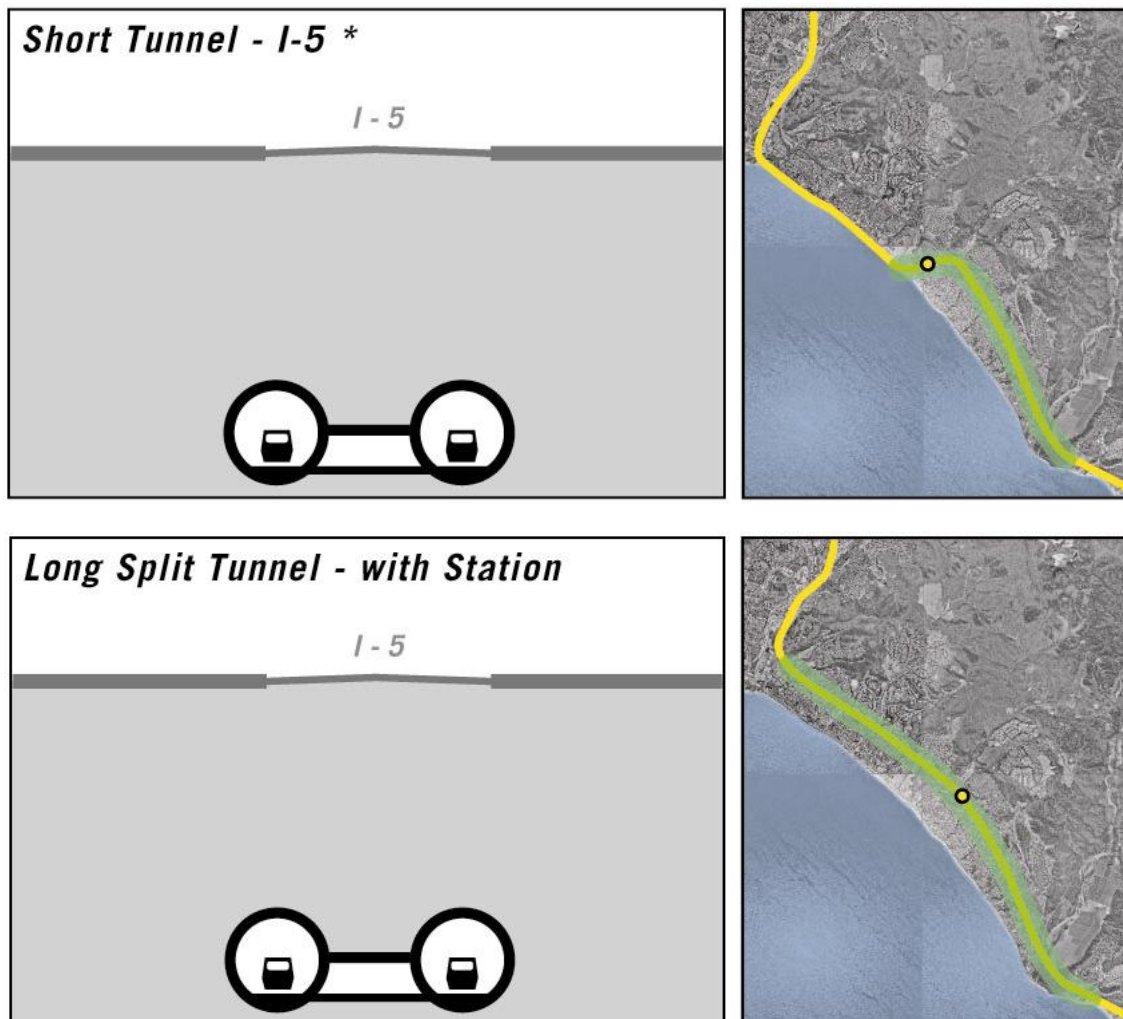
Two improvement options are being evaluated for the section of the LOSSAN corridor that passes through Dana Point and San Clemente (see Figure 2.5.1-3):

- **Curve Realignment and Short Tunnel along Interstate 5** – This option involves straightening the existing Dana Point curve at grade, and double-tracking through San Clemente in a short tunnel under I-5 between Palm Drive and San Onofre State Beach (north of the San Onofre Power Plant). The tunnel alignment leaves the I-5 corridor at Avenida Palizada, turns toward the coast, and runs underneath residential, industrial, and vacant areas. It reconnects with the existing LOSSAN rail corridor just south of Camino Capistrano. This option was carried forward as a superior option to either the short or long trench options (see Section 2.2) because the Short Tunnel option would avoid the high impacts to the beach and community in San Clemente.
- **Long, Two-Segment Tunnel along Interstate 5** – This option would preclude the need for straightening the Dana Point curve. It would involve double-tracking the rail corridor in a long tunnel under I-5 from San Onofre State Beach to Avenida Aeropuerto in San Juan Capistrano. This tunnel would be built in two segments in order to provide for a station in San Clemente. Near Avenida Pico, the tunnel would veer to the east edge of I-5 and daylight into an open trench for about 1,000 feet where a new station would be located. The existing rail corridor along the coast between southern San Clemente city limits to approximately Avenida Aeropuerto in San Juan Capistrano would be removed from service (or at least not be further improved from its existing condition). This option was determined to be superior to the long, single-segment tunnel (Section 2.2) because it would be easier to construct and operate, and would allow for a station in San Clemente.

Camp Pendleton

Across the US Marine Corps Camp Pendleton property, a second main track would be constructed at-grade in the portions of this segment (about 6 miles [9.6 km]) that are not already double-tracked or that will be double-tracked under the rail improvements included in the No Project/No Action Alternative. New double tracking would cross San Mateo, San Onofre, and Santa Margarita Creeks.

Figure 2.5.1-3
Options to be Retained for Further Study in Dana Point/San Clemente



Stations

- San Juan Capistrano: A new station would be constructed with the At-Grade/Open Trench option along Trabuco Creek. This station would be below-grade in the trench south of Ramos Street. No station would be feasible in San Juan Capistrano for the I-5 tunnel option.
- San Clemente: The tunnel options being evaluated would eliminate the train station in downtown San Clemente. A new below-grade station would be constructed along the long, two-segment tunnel alignment where the tunnel transitions to a trench just south of Avenida Pico on the east side of I-5. Similarly, for the short tunnel option, a new station would be located at Avenida Pico near Calle De Los Molinos.

OCEANSIDE TO SAN DIEGO SANTA FE DEPOT

Carlsbad

Two options are being evaluated for double-tracking through the City of Carlsbad

- At-grade Option - Double-tracking through Carlsbad in the existing LOSSAN rail alignment at grade.
- Trench Option – Double-tracking through Carlsbad in an open trench along the existing LOSSAN rail alignment.

Encinitas

Two options are being evaluated for double-tracking through the City of Encinitas (see Figure 2.5.1-4):

- At-grade (with Grade Separations) Option - Double-tracking through Encinitas primarily at-grade, with a short trench segment for the rail corridor on either side of Birmingham Drive. This option would include reconfiguring the street intersection at Birmingham Drive and San Elijo Avenue, and close Chesterfield Drive at San Elijo Avenue. Another grade separation would occur at Leucadia Boulevard where the tracks would be depressed. Pedestrian undercrossings would be placed along the route to reduce existing barrier effects on the community.
- Short Trench Option - Double-tracking in the same alignment as the at-grade option above, but with an additional covered trench under Encinitas Boulevard and a transitional open trench about 1,500 feet either side of Encinitas Boulevard. This option was determined to be superior to the Long Trench option eliminated (Section 2.2) because it would provide the same benefits as the longer trench but would cost substantially less.

Del Mar

Two tunnel options are being evaluated in the area of Del Mar, both deviating from the existing LOSSAN rail corridor alignment (see Figure 2.5.1-5):

- Camino del Mar Tunnel # 1 - Double-tracking would be done via a tunnel underneath Camino Del Mar. The tunnel would begin at Jimmy Durante Boulevard, and daylight at Carmel Valley Road where tracks would then connect with the existing LOSSAN

alignment across Los Peñasquitos Lagoon. The existing rail track on the Del Mar bluffs would be removed from service. This tunnel option was determined to be superior to Camino del Mar Tunnel #2 (see Section 2.2.) which would include a curve straightening running under residential property and affecting sensitive lagoon areas. Tunnel #1 would avoid those impacts by eliminating the curve straightening, but would still provide nearly the same train performance benefits without the straightening, and would cost less.

- Tunnel under Interstate 5 - Double-tracking with this option would be done via a tunnel that would run under I-5 and daylight along the southern boundary of the San Dieguito Lagoon. Tracks would reconnect with the existing LOSSAN rail corridor at-grade near the Del Mar race track. The existing rail track on the Del Mar bluffs would be removed from service. This option would be the most costly of the options considered but it would avoid the Peñasquitos Lagoon required in the Camino del Mar #1 option, and the existing lagoon crossing structure would be removed from service. This option was developed and carried forward for further evaluation at the request of resource management agencies in the LOSSAN region.

I-5/805 Spilt to Highway 52

Two tunnel options are under consideration in this section:

- Miramar Hill Tunnel – Double-tracking would be done via a tunnel that would cut through Miramar Hill. This tunnel option would include a new underground station at the University Towne Centre (UTC).
- Interstate 5 Tunnel – Double-tracking would be done in this option via a tunnel underneath I-5. No station would be included in this section with the I-5 tunnel option.

Highway 52 to Santa Fe Depot

In this section of the rail corridor, the corridor would be double-tracked in its existing alignment for the full length of the section. An existing curve just south of Highway 52 would be straightened, requiring two new bridges over wetlands in San Clemente Canyon. New bridges would also be constructed over Tecolote Creek and the San Diego River. Tracks would be placed in a trench between Sassafras Street and Cedar Street. This section ends at San Diego's Santa Fe Depot.

Stations

- Oceanside: Bypass tracks and additional parking would be added at this existing LOSSAN station.
- Solana Beach: Platform modifications and additional parking would be required at this existing LOSSAN station.
- University Towne Centre (UTC): This would be a new, underground station constructed with the Miramar Hill Tunnel option.
- Santa Fe Depot (San Diego): Bypass tracks and expanded parking would be added to this existing LOSSAN station in downtown San Diego.

Figure 2.5.1-4
Options to be Retained for Further Study in Encinitas

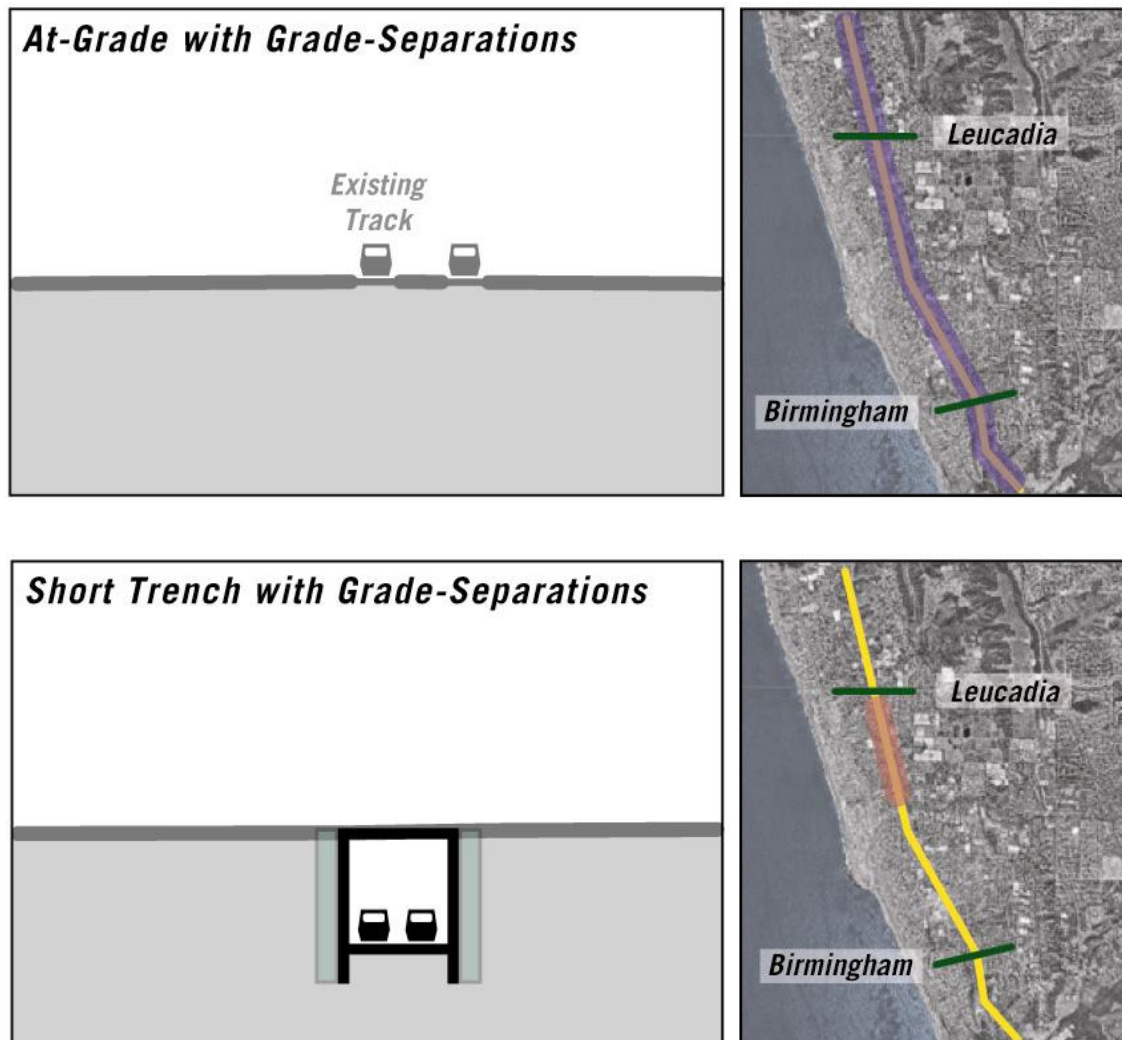
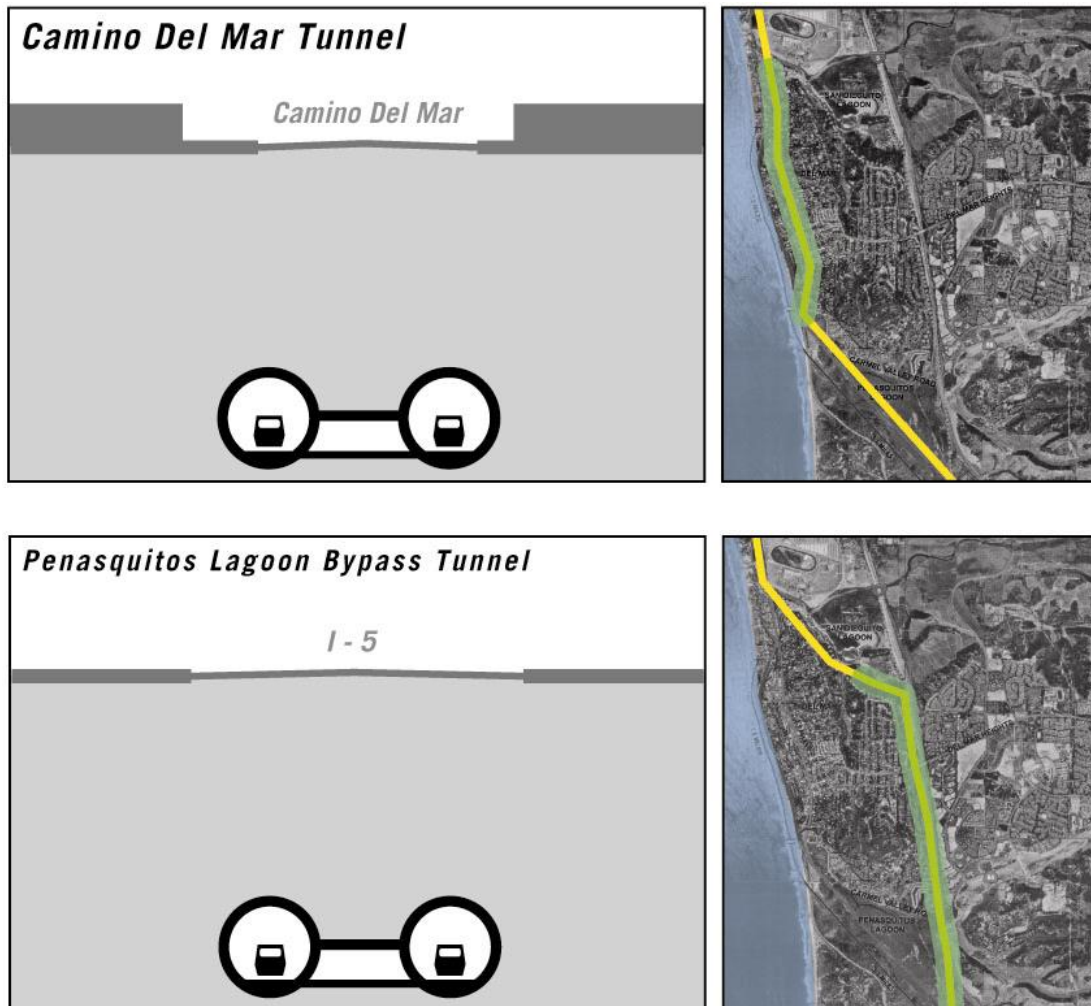


Figure 2.5.1-5
Options to be Retained for Further Study in Del Mar



2.6 SUMMARY OF ALTERNATIVES CARRIED FORWARD

2.6.1 No Project/No Action Alternative

The No Project Alternative is the baseline for comparing the potential environmental impacts and benefits of the Rail Improvements Alternative being analyzed in this EIR/EIS. It describes the highway and conventional rail facilities that existed in 1999-2000 as they will be after improvements that have been approved and funded in the fiscally constrained¹³ and conforming regional and State Transportation Improvement Programs (RTPs, STIP) are in place. When this financially constrained level of infrastructure improvement is analyzed with the significant growth in population and transportation demand that is projected to occur by 2020, the data shows that most highways serving the intercity travel market would be at capacity, and the level of congestion would severely affect the reliability of travel and the travel time between Los Angeles and San Diego.

2.6.2 Rail Improvements Alternative

Table 2.6-1 summarizes the rail improvement options being evaluated in this document for the LOSSAN conventional rail corridor. Together, these options constitute the “Build Alternative”, the Rail Improvements Alternative, and are compared to one another and to the No Project Alternative in subsequent chapters of this document.

It is important to note that any option under consideration in each segment¹⁴ of the corridor between Los Angeles and San Diego could be implemented without limiting the options in adjacent segments. In other words, the selection of one of the final options carried forward in any given segment would allow any of the options in an adjacent segment (including the No Project/No Action option) to be implemented. Conceptual designs were developed for all of the alignment options that include horizontal alignment, profile, and general infrastructure cross sections. The relation of each of the alignment options to other existing transportation facilities is also a key aspect of the conceptual designs. This information defines the general physical characteristics of the options for consideration in the environmental technical analyses presented in this Program EIR/EIS.

**Table 2.6-1
Summary of Final Rail Improvements Alternative**

Alignment Segments and Station Locations	Description of Rail Alignments and Improvements
Union Station To Fullerton Station 4 th Main Track	Construction of fourth main track at-grade in existing rail corridor between Commerce and Fullerton.
Fullerton Station To Irvine Station Double Tracking	Double track (with two alternatives, shown below)
A. AT-GRADE Double Tracking	Grade separations at street intersections between Walnut Ave. in Orange and E. 17 th Street in Santa Ana. At-grade curve straightening between Batavia Street and Walnut Ave. Improvements would be in existing rail corridor ROW, except for the curve realignment.
B. Double tracking in TRENCH	Fully grade-separate existing rail corridor in a covered trench (same alignment as above), including curve straightening.
Stations Fullerton	Existing station. Proposed improvements include bypass tracks, platform reconfiguration, and additional parking.

¹³ “Fiscally or Financially Constrained” plans are limited by the foreseen available funding for a project in a region.

¹⁴ “Segment” here refers to the endpoints shown in Table 2.5-1 (for example, “Union Station to Fullerton Station” or “San Juan Capistrano”).

Alignment Segments and Station Locations	Description of Rail Alignments and Improvements
Anaheim	Existing station. Proposed improvements include bypass tracks and additional parking.
Santa Ana	Existing station. Proposed improvements include bypass tracks and additional parking.
Irvine	Existing station. Proposed improvements include bypass tracks and additional parking.
San Juan Capistrano Double Tracking	
A. TUNNEL along I-5 between Hwy 73 and Avenida Aeropuerto	Double-tracking in a tunnel running the length of the City of San Juan Capistrano under Interstate 5; tunnel runs under Trabuco Creek and San Juan Creek.
B. AT-GRADE and Open/Cut and Cover TRENCH along east side of Trabuco Creek	Double-tracking at grade and in an open/cut and cover trench along the east side of Trabuco Creek, west of the existing rail alignment.
Stations San Juan Capistrano	New station would be constructed with the At-Grade/Open Trench option along Trabuco Creek. New station would be below-grade in open trench. No station would be included in San Juan Capistrano for the I-5 tunnel option.
Dana Point/San Clemente Double Tracking	
A. Dana Point Curve Realignment; San Clemente - SHORT TUNNEL	Double-tracking and straightening existing curve at Dana Point in existing rail corridor; double-tracking via a short tunnel that follows Interstate 5 between Palm Drive and San Onofre State Beach, north of the power plant. The short tunnel alignment leaves the Interstate 5 corridor at Avenida Palizada, turns toward the coast and runs underneath residential, industrial and vacant areas, connecting with the existing rail corridor just south of Camino Capistrano.
B. San Clemente - LONG TWO-SEGMENT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)	Double-tracking via a long, two- segment tunnel following Interstate 5 from San Onofre State Beach to Avenida Aeropuerto in San Juan Capistrano. This option precludes the need for curve realignment at Dana Point. This tunnel would have the same alignment as the one-segment long tunnel above except in a one-mile stretch near Avenida Pico, it would veer to the east edge of I-5 and daylight into an open trench for about 1,000 feet. The existing rail corridor along the coast between southern San Clemente city limits to approximately Avenida Aeropuerto in San Juan Capistrano would be removed from service (or at least not be further improved from its existing condition).
Stations San Clemente	The tunnel options would eliminate the need for a train station downtown; a new below-grade station would be constructed along the tunnel alignment where the tunnel transitions to a trench.
Camp Pendleton Double Tracking	Construction of an at-grade second main track, in portions of this segment (about six miles) that are not already double-tracked or will be under the rail improvements included in the No Build Alternative. New double tracking would cross San Mateo, San Onofre, and Santa Margarita Creeks.
Oceanside/Carlsbad Double Tracking	
A. Carlsbad - AT-GRADE; double tracking	Double-tracking through Carlsbad in existing rail alignment at grade. Alignment crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons
B. Carlsbad -TRENCH; double-tracking	Double-tracking through Carlsbad in existing rail alignment in trench. Alignment crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons
Stations Oceanside	Existing station. Proposed improvements include bypass tracks and parking expansion.

Alignment Segments and Station Locations	Description of Rail Alignments and Improvements
Encinitas/Solana Beach Double Tracking	
A. Encinitas - AT-GRADE; Double Tracking	Double-tracking primarily at-grade, with a short trench segment for the rail corridor on either side of Birmingham Drive. This option would include reconfiguring the street intersection at Birmingham Drive and San Elijo Avenue, and close Chesterfield Drive at San Elijo Avenue. Another grade separation would occur at Leucadia Boulevard where the tracks would be depressed. Pedestrian undercrossings would be placed along the route. Alignment crosses San Elijo Lagoon.
B. Encinitas - SHORT TRENCH; Double Tracking	Double-tracking in same alignment as at-grade option above, but with an additional covered trench under Encinitas Boulevard and a transitional open trench about 1,500 feet either side of Encinitas Boulevard. Alignment crosses San Elijo Lagoon.
Stations Solana Beach	Existing station. Proposed improvements include platform modifications and parking expansion.
Del Mar Double Tracking	
A. TUNNEL under Camino Del Mar; crosses San Dieguito and Los Penasquitos Lagoons	Double-tracking via a tunnel underneath Camino Del Mar. Tunnel would begin at Jimmy Durante Boulevard, and daylight at Carmel Valley Road where tracks would then connect with the existing alignment across Los Penasquitos Lagoon. The existing rail track on the bluffs would be removed from service.
B. TUNNEL along Interstate 5	Double-tracking via a tunnel that would run under Interstate 5 and daylight along the southern boundary of San Dieguito Lagoon. Tracks would reconnect with the existing rail at-grade near the Del Mar race track. The existing rail track on the bluffs would be removed from service.
I-5/805 Split To Hwy 52 Double Tracking	
A. Miramar Hill TUNNEL	Double-tracking via a tunnel through Miramar Hill.
B. Interstate 5 TUNNEL	Double-tracking via a tunnel under Interstate 5.
Stations UTC (Only applies to Miramar Hill Tunnel)	New station, proposed only with the Miramar Hill tunnel option. Station would be constructed underground.
Hwy 52 To Santa Fe Depot Curve realignment and Double Tracking	Double-tracking in existing rail corridor for full length of segment. An existing curve just south of Highway 52 would be straightened, requiring two new bridges over wetlands in San Clemente Canyon. New bridges would also be constructed over Tecolote Creek and San Diego River. Tracks would be placed in a trench between Sassafras Street and Cedar Street.
Stations Santa Fe Depot	Existing station. Proposed improvements include bypass tracks and parking expansion.